DOCUMENT RESUME

ED 242 945 CE 038 791

AUTHOR	Swezey, Robert W.; And Others
TITLE	Organizational and Systems Theory: An Integrated Review. Technical Report 595.
INSTITUTION	Science Applications, Inc., McLean, VA. Behavioral Sciences Research Center.
SPONS AGENCY	Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.
REPORT NO	ARI-TR-595; SAI-80-113-178
PUB DATE	Sep 80
CONTRACT	MDA-903-79-C-0699
NOTE	318p.
PUB TYPE	Information Analyses (070)
EDRS PRICE	MF01/PC13 Plus Postage.
DESCRIPTORS	Adult Education; Information Processing; *Management Development; Military Service; Military Training; Organizational Development; *Organizational Effectiveness; *Organizational Theories; Research Needs; *Simulation; *Systems Approach
IDENTIFIERS	*Organizational Psychology

ABSTRACT

A review of the theoretical and empirical literature was conducted to identify, in a systems framework, organizational processes and dimensions associated with effective functioning. Potential methodologies for use in controlled organizational experimentation were also explored. Literature was reviewed according to an empirically derived six-factor taxonomy. The factors were multidimensional information processing, organizational systems dynamics, organizational change technologies, management authority/compliance characteristics, organizational coordination, and goal orientation. Research pertaining to industrial, academic, and military organizations was included. It was concluded that simulation appears to be an appropriate methodology for controlled experimentation with organizations. Eleven research needs were identified that appear to be appropriate both for extending the state-of-the-art in organizational/systems psychology and for possible consideration in developing an organizational test bed. (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

OE

Technical Report 595

ED242945

ORGANIZATIONAL AND SYSTEMS THEORY: AN INTEGRATED REVIEW

Robert W. Swezey, Elaine G. Davis,
E. Scott Baudhuin, Siegfried Streufert,
and Robert Evans

LEADERSHIP AND MANAGEMENT TECHNICAL AREA

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

U. S. Army
Research Institute for the Behavioral and Social Sciences

September 1980

Approved for public release; distribution unlimited.

CE038791

U. S. ARMY RESEARCH INSTITUTE
FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the
Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON Technical Director	**L. NEALE COSBY** Colonel, IN Commander

---

Research accomplished under contract
for the Department of the Army

Science Applications, Inc.

NOTICES

DISTRIBUTION: Primary distribution of this report has been made by ARI. Please address correspondence concerning distribution of reports to: U.S. Army Research Institute for the Behavioral and Social Sciences, ATTN: PERI-TST, 5001 Eisenhower Avenue, Alexandria, Virginia 22333.

FINAL DISPOSITION: This report may be destroyed when it is no longer needed. Please do not return it to the U.S. Army Research Institute for the Behavioral and Social Sciences.

NOTE: The findings in this report are not to be construed as an official Department of the Army position, unless so designated by other authorized documents.

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Technical Report 595	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) ORGANIZATIONAL AND SYSTEMS THEORY: AN INTEGRATED REVIEW		5. TYPE OF REPORT & PERIOD COVERED Technical Report 1 Oct 1979 - 30 Sept 1980
		6. PERFORMING ORG. REPORT NUMBER SAI-80-113-178
7. AUTHOR(s) R. W. Swezey, E. G. Davis, E. S. Baudhuin, S. Streufert, R. A. Evans (Science Applns, Inc.)		8. CONTRACT OR GRANT NUMBER(s) MDA 903-79-C-0699
9. PERFORMING ORGANIZATION NAME AND ADDRESS Behavioral Sciences Research Center Science Applications, Inc. 1710 Goodridge Drive, McLean, VA 22102		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 2Q162722A791 3E02
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Ave., Alexandria, VA 22333		12. REPORT DATE 30 September 1980
		13. NUMBER OF PAGES 316
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) ---		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE ---

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

---

18. SUPPLEMENTARY NOTES

---

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Goal Setting	Organizational Effectiveness
Information Processing	Organizational Psychology
Management	Simulation
Organizational Development	Systems Theory

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A review of the theoretical and empirical literature representing the areas of organizational psychology and systems theory is presented. Organizational characteristics and processes are identified which are applicable for management training and which address organizational functioning. Literature was reviewed according to an empirically-derived six-factor taxonomy. The factors were: (1) multidimensional information processing, (2) organizational systems dynamics, (3) organizational change technologies, (4) management authority/

(continued)

Item 20 (continued)

compliance characteristics, (5) organizational coordination, and (6) goal orientation. Research pertaining to industrial, academic and military organizations is included. It was concluded that simulation appears to be an appropriate methodology for controlled experimentation with organizations. Unique requirements of training-oriented simulations are discussed. Eleven general research needs are identified for possible consideration in developing an organizational test bed.

Technical Report 595

ORGANIZATIONAL AND SYSTEMS THEORY: AN INTEGRATED REVIEW

Robert W. Swezey, Elaine G. Davis,
E. Scott Baudhuin, Siegfried Streufert,
and Robert Evans
Science Applications, Inc.

Submitted by:
T. Owen Jacobs, Chief
LEADERSHIP AND MANAGEMENT TECHNICAL AREA

Approved by:
Joyce L. Shields, Director
MANPOWER & PERSONNEL
RESEARCH LABORATORY

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES
5001 Eisenhower Avenue, Alexandria, Virginia 22333

Office, Deputy Chief of Staff for Personnel
Department of the Army

September 1980

Army Project Number
2Q162722A791

Organizational Effectiveness
Technology Development

Approved for public release; distribution unlimited.

ARI Research Reports and Technical Reports are intended for sponsors of R&D tasks and for other research and military agencies. Any findings ready for implementation at the time of publication are presented in the last part of the Brief. Upon completion of a major phase of the task, formal recommendations for official action normally are conveyed to appropriate military agencies by briefing or Disposition Form.

FOREWORD

The research reported here was accomplished by the Leadership and Management Technical Area, Organizational Effectiveness Technology Development Work Unit of the US Army Research Institute for the Behavioral and Social Sciences. This unit has as its primary objective the enhancement of combat effectiveness through research to improve leadership and organizational processes. The research is responsive to Army Project 2Q162722A791, technology for improved manpower and personnel management and training, FY 80 Work Program.

The rapidly changing and complex environment of the modern Army makes it imperative that organization leadership, climate, and processes function optimally. This work unit researches these areas, thus providing information to Army leadership which can be used to improve combat readiness and quality of work life. This report is part of a larger project to develop a senior management assessment training and simulation research system for the Army.

Edgar M Johnson

EDGAR M. JOHNSON
Technical Director

ORGANIZATIONAL AND SYSTEMS THEORIES: AN INTEGRATED REVIEW

BRIEF

Requirement:

Organizational processes underlying military organizational effectiveness and management training are not well understood. Further, controlled experimentation with organizations is difficult to accomplish. A review of literature was conducted to identify, in a systems framework, organizational processes and dimensions associated with effective functioning and potential methodologies for use in controlled organizational experimentation.

Procedure:

Based upon a key word list of 85 dimensions of organizational behavior and systems concepts, a series of computerized and manual literature searches were conducted. Current, representative literature was retrieved for inclusion in a data base. Documents were abstracted and collected in an annotated bibliography (Davis et al., 1980), using a six-factor taxonomy developed by Baudhuin et al. (1980). Literature was then reviewed in terms of the six factors. An additional review was conducted for literature dealing with methodologies in organizational research.

Findings:

A number of research needs were identified which appear to be appropriate for extending the state-of-the-art in organizational/systems psychology. These needs include: (1) improved methodologies for studying organizational behavior, (2) methods for introducing complexity into organizational research efforts, (3) methods of quantifying and operationalizing both organizational performance variables and systems theoretic constructs, (4) research on organizational factors and their impact upon decision making behaviors, (5) improved techniques for providing negative feedback to subordinates, (6) methods for reducing organizational resistance to change, (7) research on goal setting behavior and its effects upon organizational performance, (8) research on improved communication processes in organizations, (9) research on the topic of influence processes in organizations and their effects upon organizational behavior, (10) research on aspects of organizational subgroup autonomy, (11) research in the area of organizational conflict management and resolution. Regarding methodology, simulation (especially experimental and quasi-experimental simulation methodologies) appears applicable to controlled research with organizational systems.

Utilization of Findings:

One or more of the identified research needs will be used as the basis for the establishment of an experimental test bed for conducting organizational research in a military setting. Simulation techniques will be employed in the test bed, as described in a previous report on test bed specifications (Streufert and Swezey, 1980).

CONTENTS

Chapter Title Page

INTRODUCTION 1

1 FACTOR I: MULTIDIMENSIONAL INFORMATION PROCESSING 5

A. Theoretical Background 5

Complexity Theory 6

Related Theories 8

Differentiation and Integration in Organizations . 9

Processing Organizational Information 11

Systems Theoretic Aspects of Organizational Information Processing 12

Models for Organizational Decision Making 14

B. Research 22

Processing Demand in Individuals and Small Groups 22

Processing Demand in Organizations 23

2 FACTOR II: ORGANIZATIONAL SYSTEMS DYNAMICS 25

A. Theoretical Background 25

Systems Theory as a Conceptual Referent 25

Open vs. Closed Systems 31

Subsystems 38

Adaptation-Adaptability 41

Growth 57

B. Research 63

System Openness 63

Adaptation-Adaptability 64

Chapter Title Page

3 FACTOR III: ORGANIZATIONAL CHANGE TECHNOLOGIES 68

A. Theoretical Background 68

Planned Change and Organizational Development . . . 72

Change Agent 79

The Planned Change Intervention Process 82

Introduction 82

Diagnostic Phase 85

Data Gathering 85
Goal Setting 88

Action Phase 91

Focus of Change 91
Targets of Change 94
Types of Interventions 98

Evaluation 108

B. Research 109

Research Design 109

Research Findings 118

Survey Feedback 118

Job Design 120

Team Development (Team Building) 123

OD in the Military 129

Management/Development Training 136

Sensitivity Training 137

Grid OD 137

Management by Objectives 140

Feedback and Organizational Change 142

Chapter Title Page

4 FACTOR IV: MANAGEMENT AUTHORITY/COMPLIANCE CHARACTERISTICS 144

A. Theoretical Background 145

Authority 146

Power 147

Role 151

Conflict 153

Systems Concepts and Management Authority 155

B. Research 156

Hierarchy 156

Power 159

Authority 162

Influence 163

Role 165

Conflict 168

5 FACTOR V: ORGANIZATIONAL COORDINATION AND CONTROL 171

A. Theoretical Background 172

The Process of Control 173

Organization-Environment Interface 175

Organization Factors, People and Control 176

Centralization/Decentralization 179

Chapter Title Page

B. Research 181

Source of Power 181

Hierarchy of Authority 182

Departmental Power (Lateral Power) 184

Structural Correlates of Centralization 187

Determinants of Structuring and Centralization . . 190

6 FACTOR VI: GOAL ORIENTATION 191

A. Theoretical Background 191

Systems Concepts and Goal Orientation 206

B. Research 209

Goal Setting 210

7 METHODOLOGY 218

A. The Organization as a System 218

B. Experimenting and the Organization 219

C. Alternatives to Experimenting with Organizations . . . 220

D. Systems Theory and Methodology: The Move Toward Simulation 221

E. The Use of Simulations for Experimentation in Organizational Psychology 222

Definitions of Simulation 222

Bridging the Gap Between Field and Lab 223

Reasons for the Use of Simulation Techniques . . . 224

Advantages of Simulations 225

Problems of Simulations 226

CONTENTS (Continued)

Chapter Title Page

F. Simulation Types and Related Methodologies 227

Free Simulations 228

Experimental Situation Methods 231

Differential Forms of Experimental Simulations . . . 233

Some Problems Encountered with Experimental Simulations 235

Computer Simulations and Model Building 236

Man-machine Simulations 242

Games 243

Role Playing 244

In-basket Techniques 245

G. Simulation and Training 245

Free vs. Experimental Methods in Training Simulations 247

H. Unique Requirements of Training-oriented Simulations . 250

I. Assessment 251

J. Summary 251

8 SUMMARY AND RESEARCH NEEDS 253

A. Methodology 256

B. Research Needs 256

REFERENCES 260

LIST OF TABLES

Table 1. Comparison of organizational decision making models 17

2. Contingencies affecting openness and flexibility of organizational structure 37

Page

Table 3. Effectiveness criteria and frequency of usage in seventeen multivariate models 52
4. Summary of change agent competencies 80
5. Change agent roles 81
6. Phase conceptions of the organizational intervention process 83
7. Comparison of OD research designs 110
8. Key findings on effectiveness of survey feedback 120
9. Key findings on effectiveness of job design 121
10. Key findings on effectiveness of team building 123
11. Characteristics indicating differences between successful and unsuccessful change in organizations 128
12. Alterable and unalterable characteristics 130
13. OD programs in the military 131
14. Characteristics of Type A and Type Z organizations 204
15. Summary: Functions of goals and goal setting related to differences in organizational structure 205
16. Function of goals and goal setting in organizations 207
17. Response of managers to "exercise objectives" 210
18. The value of various methodologies related to simulation methods for organizational systems 252

LIST OF FIGURES

Figure 1. The information processing paradigm 15
2. The total system 41
3. The adaptation stage of the organizational change process 44

Page

Figure 4. Organization renewal 60

5. Systems view of the organization 69

6. A systems model of organizational change 69

7. Interdependency among subsystemic changes 94

8. The managerial grid 138

9. Model of power 150

10. Influence graph 164

11. Decision process of control 174

12. Complexity of organizational goals 193

13. Goal setting process 197

14. The means-end chain 198

15. An MBO model for superior-subordinate objective setting . 201

16. Hierarchical strategic relationships 203

INTRODUCTION

This document is one of several which report on research conducted by the Behavioral Sciences Research Center at Science Applications, Inc., under Contract No. MDA 903-79-C-0699 with the U.S. Army Research Institute for the Behavioral and Social Sciences. Other documents in the series include:

Baudhuin, E. S., Swezey, R. W., Foster, G. D. and Streufert, S. *An empirically derived taxonomy of organizational systems.* (SAI Report No. SAI-80-091-178) McLean, VA: Science Applications, Inc., 1980.

Davis, E. G., Foster, G. D., Kirchner-Dean, E., and Swezey, R. W. *An annotated bibliography of literature integrating organizational and systems theory.* (SAI Report No. SAI-80-082-178) McLean, VA: Science Applications, Inc., 1980.

Streufert, S. and Swezey, R. W. *Organizational simulation: Theoretical aspects of test bed design.* (SAI Report No. SAI-80-010-178) McLean, VA: Science Applications, Inc., 1980.

This report provides a discussion of organizational and systems theories as they relate to organizational functioning and effectiveness. The literature reviewed herein addresses both fields, and is particularly oriented toward their interface. Processes and criteria employed in identifying literature relevant to this effort are described in detail in Davis et al. (1980), cited above. Briefly, the procedure involved: (1) development of key word lists identifying principal variables/concepts in organizational behavior, organizational effectiveness and development, training and systems theory; (2) identification of relevant documents and articles via computerized database searches and manual library searches; (3) retrieval of the documents and cataloging them into a database; and (4) abstracting the literature and development of an annotated bibliography (see Davis et al., 1980).

Three criteria were developed to direct this effort: currency, completeness and representativeness. Regarding currency, literature from

1960 through 1980 was emphasized. Review articles and other important sources are included however, which draw upon earlier literature as appropriate. The criterion of completeness was addressed in terms of sources (over 100 primary sources were surveyed, including refereed journals, professional society proceedings, university publications, theses and dissertations, books and technical reports of federally- and privately-funded research) and breadth of coverage (key word lists identified 85 dimensions of organizational behavior and systems theory concepts for investigation). Lastly, the criterion of representativeness was used as the basis for trade-offs between completeness and the manageability/feasibility of this effort.

The literature review, itself, was conducted according to a taxonomy generated in a previous portion of this effort (see Baudhuin et al., 1980), cited above. This taxonomy was generated empirically by classifying each of several organizational/systems theoretic articles according to a checklist format regarding the extent to which each document addressed various topic areas of interest to the effort. A factor analysis model was then applied to the document classifications in order to generate a candidate group of factors upon which to base a taxonomy. Various factor reliability indices were computed, and a final solution was reached which involved the establishment of six primary factors. These six factors, then, are the basic taxonomic categories employed in this review. (See Baudhuin et al., 1980, for a discussion of the taxonomic development effort and details of the methodology employed.)

The factors are:

- Factor 1: Multidimensional Information Processing. The variables which loaded on this factor reflect both a process systems model of organizations and/or the individual/group/organization processes associated with acquiring information, processing information, and disseminating that information (including decision making) as components in complex multidimensional environments. They also addressed the structure of how information is processed in organizations.

- Factor II: Organizational Systems Dynamics. The variables which loaded on this factor represent the characteristics of an organizational system relative to its adaptation and flexibility as it copes with its environment, attempts to maintain a relatively steady state or balance, and utilizes its resources to grow in more or less planned ways.
- Factor III: Organizational Change Technologies. The variables loading on this factor focus on those techniques normally associated with the organizational development/organizational effectiveness domain and reflect concerns for individual growth and development in organizations, personnel interface with jobs, the organization, and the work process. This factor identifies human resource technologies associated with enhancing individuals and work group perceptions regarding job development and/or modification.
- Factor IV: Management Authority/Compliance Characteristics: The variables loading on this factor are associated with the dimensions of influence and power as components in the superior/subordinate organizational scheme where compliance is required, for example, from subordinates relative to their position or level in the organization. The variables reflect status or hierarchical leveling attributes found in most organizations normally associated with management control procedures.
- Factor V: Organizational Coordination and Control. The variables which loaded on this factor reflect characteristics of organizations associated with structure and those concerns leading to the coordination and/or control of the organizational systems, subsystems and subsidiaries.
- Factor VI: Goal Orientation. Variables loading under this factor reflect those activities that organizations and individuals engage in to determine desired states that the organizational system and its personnel are attempting to achieve through planning,

> organizing, and controlling, Most organizations, by definition, are goal directed, and the variables which loaded on this factor focus on the range of goal activities required by an organizational system to determine priorities, to achieve objectives, and to modify or replace those objectives no longer important to the system.

If one conceives of the fields of organizational and systems theory as two intersecting domains, this report may be viewed as describing certain bounded areas within that intersection. Each of the six dimensions identified through factor analysis represents an independent aspect of the organizational/systems interface. This does not imply that the factors identified herein are exhaustive of the organizational/systems domain. Many areas were not considered in this analysis. This review represents an attempt to identify theoretical and research literature on the principal areas of concern to organizational and systems practitioners. The principal integration occurs within factors at the interface of organizational and systems theory, rather than across factors, although this was achieved in several instances (note especially Factors IV and V). Gaps in this review undoubtedly exist, as there are many relevant areas not adequately addressed by either theory or research. However, an attempt is made in the final chapter of this report to address research needs.

The purpose of this review was to identify characteristics and processes in the literature which can be used in experimental research on organizational functioning. Chapters 1 through 6 suggest various potential independent and dependent variables. An additional chapter (7) addresses experimental methodology. Several methodologies are discussed, and the advantages and disadvantages of each are considered in the context of organizational research. Based upon the literature reviewed herein and upon a report developed previously in this effort (Streufert and Swezey, 1980), simulation techniques appear applicable to organizational research efforts. Several types of simulation techniques are discussed and evaluated for potential use in organizational test bed development efforts (See Streufert and Swezey, 1980, for a discussion of test bed development specifications).

1. FACTOR I: MULTIDIMENSIONAL INFORMATION PROCESSING

Factor I reflects individual and organizational processes in open systems. It is concerned with informational input into the system, the perception of that input, its classification and organization, its differentiation and integration through the structure of the organization, and the resulting output (e.g., a decision, a product, a service). The emphasis is on complex inputs to and complex outputs from complex organizations, i.e., we are dealing with the multidimensionality of information processing. The process described in this factor is inherent in "open systems," where information must continue to flow from input to output, and where simple information processing is quite insufficient because of the complexity and uncertainty that is part of the input-organization-output chain.

A. THEORETICAL BACKGROUND

Within a general systems theory framework, complexity theory (Schroder, Driver and Streufert, 1967; Streufert and Streufert, 1978) and its antecedents (e.g., Harvey, Hunt and Schroder, 1961; Bieri, Atkins, Briar, Leaman, Miller, and Tripodi, 1966; Witkin, Goodenough and Karp, 1967) to name a few, deal specifically with the processing of information (or other energy through complex systems). While the theoretic notions suggested by earlier theorists (e.g., Harvey et al., 1961; Schroder et al., 1967) were more concerned with individuals, later writers have expanded their propositions to groups and organizations as well (e.g., Streufert and Streufert, 1978) or have focused specifically on the functioning of individuals or groups in the organizational context (e.g., Streufert, 1978). Since the concepts emerging as a group under Factor I represent the essence of complexity theory, we shall discuss that theory here in abridged form.

Complexity Theory

Complexity theory predicts the outcome of an interaction between environment and information processing stylistics. It does not primarily emphasize the particular content of the information that is processed, but dwells instead on the structure through which processing occurs. In other words, the theory is primarily concerned with how persons think or how organizations operate, and only secondarily with what persons think and what information flows through an organization.

Assumptions are made about different characteristics of the environment to which a person or an organization is exposed, the internal environment of the organization or the stored information of an individual, the task characteristics and the processing requirements for that task, the structural characteristics of the system through which the information is processed, the required output and, finally, content of the information that must be processed. The theory is expressed as a number of curves relating input to output. It is assumed that an increase in processing demands from the environment to the system (via quantity of the information to be processed, via stress, etc.) will initially produce a rise in information processing quality. Beyond some optimal point, however, that quality will begin to drop, so that with extremely high demands, information processing quality will diminish to very low levels (similar to those experienced in the absence or near-absence of processing demands). In other words, the relationship between processing demands on one side and quality of processing on the other side is viewed as an inverted U-shaped function.

Complexity theory also considers the characteristics of the processing system. The more differentiated and integrated that system is, the higher the level of quality information processing that is achieved under optimal processing demand conditions. Specifically, the theory proposes a set of inverted U-shaped curves. The lower the differentiative and integrative capacity of the system, the flatter the curve. The higher the differentiative and integrative capacity of the system, the steeper the curve. Complexity theory describes these differences in steepness of curves as information processing styles. While information processing styles are relatively enduring characteristics of individuals, they may be more easily modifiable characteristics of organizations.

A different set of curves is postulated regarding the relationship between information processing demand and information processing quantity. With increased demand (again quantity, stress or the like), the total output level of simpler (including well-practiced) responses should increase until it reaches the system's maximal output capacity and should then stagnate. Major differences between systems that are highly differentiated and integrated and those that are not would not be expected for the generation of simpler output responses.

Different levels of differentiation and integration may occur in response to different kinds of information inputs. A system will sense the "meaning" of the incoming information (perception) and will determine the flow through the organization which the information is to follow. For individuals, the information would be considered in certain cognitive domains which would be more or less differentiated or integrated. In organizations, information flow would occur through specific sets of subsystems (departments or other units) which again would reflect differential degrees of differentiation and integration.

Obviously, complex information processing, i.e., differentiation and integration, may not be useful in all endeavors. The individual who is attacked by a mugger rarely will be able to utilize cognitive differentiation and integration when he tries to defend himself. A small business which produces a simple product on demand with available raw materials and without the need to hire non-family employees may not need to be differentiated and integrated. We are not concerned with such settings in our interpretation of Factor I (however problematic they might be for the persons or organizations involved). The frequent complexity of input into a system in the modern world, the required variability of output, and the need to re-adapt to continuing changes and uncertainties for many individuals and probably for most larger organizations tend to require a level of differentiation and integration that allow for information processing quality. They further require the maintenance of a level of information processing demand (and level of information flow through the system) that permits optimal levels of information processing quality.

In summary, complexity theory is concerned with the effect of information input from the environment into a more or less differentiated and integrated system. It follows the processing of the information through the structure of the system from sensing to decision making. It is concerned with the effects of the system's differentiative and integrative structure on simple and complex outputs. It proposes a family of inverted U-shaped curves relating the input processing demands via the differentiative and integrative capacity of the system to the quality (adaptiveness, appropriateness, etc.) of output. It further postulates a set of asymptotic curves relating input processing demands to simpler (quantity) outputs (e.g., decisions).

Related Theories

While complexity theory (Streufert and Streufert, 1978) tends to be general and is applicable to several systemic levels, other theorists have focused their attention on specific systems. Recent theory concerned with complexity in individuals has been provided by Scott, Osgood and Peterson (1979). Scott et al. are particularly concerned with measurement of differentiation and integration in individual cognitive structure and with the domains within which structures function divergently. They focus minimal attention on the environment, however. For these reasons, their approach is not particularly useful in the interpretation of Factor I.

Within organizational psychology, a number of contingency theories (e.g., Fiedler, 1967; Luthans and Stewart, 1977; Miller and Starr, 1970; Lawrence and Lorsch, 1967) relate more directly to complexity theory and to the concepts summarized in Factor I. However, the majority of these theories are not general in their orientation and tend to focus on some specific component of the organizational process (e.g., the Fiedler theory is specific to leadership, etc.). The contingency theories tend to distinguish between environmental variables and management variables of some kind and are concerned with their interactive effects on some measures of organizational behavior. As such, they parallel complexity theory with its environmental and systematic components. Luthans and Stewart (1977), for example, provided a contingency theory of management which integrates diverse process, behavioral, and quantitative approaches to management. The environmental suprasystem, resource subsystems, and management subsystems are seen as primary determinants of organizational behavior. These components combine in various ways to produce situational, organizational and performance criterion variables, which again combine to determine system performance.

Differentiation and Integration in Organizations

While it seems inappropriate to dwell extensively on complexity theory and its implications for organizations in this review, some discussion of differentiation and integration at greater length may be useful. For individuals, differentiation refers to the number of diverse (orthogonal or near-orthogonal) dimensions which an individual can bring to bear on the information which he or she perceives, either simultaneously or sequentially. The meaning of differentiation in the organizational context is quite similar: We are dealing here with the number and kind of organizational units which are involved in a task relating input to output. Nonetheless, there are some differences in the definition of differentiation from author to author. Huse and Bowditch (1977), for example, considered differentiation in organizations in a quite individual-oriented fashion. They stated that:

> "Differentiation is the difference in cognitive and emotional orientation among managers in different functioning departments."

These authors distinguished further between (1) formality of structure, (2) interpersonal orientation, (3) time orientation, and (4) goal orientation as signs of differentiation.

Lawrence and Lorsch (1967) took a more organizationally-focused view. In their opinion, differentiation can be viewed as:

> "...the state of segmentation of the organizational system into subsystems, each of which tends to develop particular attributes in relation to the requirements posed by its relevant external environment. Differentiation, as used here, includes the behavioral attributes of members of organized subsystems..."

A not quite dissimilar discussion of differentiation can be found in Porter, Lawler and Hackman (1975). These authors derived their view from the tenet "everyone in the organization does not do the same thing." The environmental situation and the goal orientation require that some degree of differentiation must take place. Porter et al. suggested further that differentiation within an organization can be horizontal (e.g., division of labor) or vertical into a hierarchy with different authority and power and with decreasing breadth of responsibility from higher to lower positions.

Important in these definitions is that each of the subunits which is differentiated from other subunits does perform a different function, akin to the different cognitive dimensions which we described earlier with regard to the individual.

Yet, differentiation alone is not enough. It would be absurd for an organization to process incoming information (e.g., an order for a particular service) only within one subsystem (e.g., in the department billing the client for a service performed) to the exclusion of other important subsystems (e.g., the organizational unit that actually is to perform the service ordered). In other words, integration is needed for successful functioning of both the individual and the organization if coping with a complex world is necessary.

Integration within the organization is the process of achieving unity of effort among the various subsystems (of an organization) in the accomplishment of that organization's task (Lawrence and Lorsch, 1967). Since integration is vitally important if an organization operating in a complex world is to achieve success, the quality of integration is of major importance. This concern with quality is reflected in some conceptualizations of the term integration in organizations themselves. For example, Huse and Bowditch (1977) defined integration as "the quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demands of the environment. Integration refers to interdepartmental relationships, as well as to the process by which it is achieved and the organizational devices used to attain it."

Of course, the degree of differentiation and integration that is required for the successful functioning of an organization must vary with the degree to which complexity (multidimensionality) is involved in the information received from the organization's environment, in the complexity necessary to maintain the functioning of the organization, in the content of the input to output demand that is placed on the organization, and so forth. While the differentiation of functions and subsystems can easily diminish with less complex demands on the organizational systems, those remaining systems must nevertheless be well integrated. To again quote Huse and Bowditch (1977): "In a more stable and less diverse environment... effective organizations have to be less differentiated, but they must still achieve a high degree of integration " (c.f., also, Lawrence and Lorsch, 1967).

Processing Organizational Information

A significant theoretical approach in organizational information processing is what has come to be called the "process performance model," adapted from the work of Bennis (1966), Parsons (1960), and Schein (1972) and expanded in terms of "organizational competence" by Olmstead et al. (1973, 1978). According to this approach, organizational competence is defined in terms of three components:

- Reality Testing. Capacity to test the reality of situations facing the organization--the ability of the organization to search out, accurately perceive, and correctly interpret the properties and characteristics of its environments (both external and internal), particularly those properties that have relevance for the functioning of the organization.
- Adaptability. The capacity to solve problems arising from changing environmental demands and to act with effective flexibility in response to these changing demands.
- Integration. The maintenance of structure and function under stress, and a state of relations among sub-units that ensures that coordination is maintained and the various sub-units do not work at cross-purposes.

Each of these capabilities in turn contains one or more organizational processes that can be measured or evaluated. These processes are derived from Schein's (1965) idea of an "adaptive-coping cycle" and include:

- Sensing. The process by which the organization acquires information about the external and internal environments.
- Communicating Information. The process of transmitting information that is sensed to those parts of the organization that can act upon it.
- Decision Making. The process of making decisions concerning actions to be taken as a result of sensed information.
- Stabilizing. The process of taking actions to maintain internal stability and integration that might otherwise be disrupted as a consequence of actions taken to cope with changes in the organization's environments.
- Communicating Implementation. The process of transmitting decisions and decision-related orders and instructions to those parts of the organization that must implement them.
- Coping Actions. The process of executing actions against an environment (external or internal) as a consequence of an organizational decision.
- Feedback. The process of determining the results of a prior action through further sensing of the external and internal environments.

Systems Theoretic Aspects of Organizational Information Processing

Such a framework as the process performance approach assumes that the systems (organizations) involved be relatively flexible or open. An open system is one which has a boundary that is permeable to inputs and outputs of matter-energy and information. Open systems exchange information, energy, or material with their environments. All living systems, all cybernetic systems and most concrete systems are open systems. In contrast, a closed system is a concrete system having boundaries through which no matter-energy or information can pass. This is a special case in which inputs and outputs are zero. No actual concrete system, however, is completely closed. (All concrete systems are either relatively open or relatively closed.) Whatever matter-energy is in the system is all there ever will be. The energy gradually is used up, and the matter gradually becomes disorganized.

Two closely related concepts are those of symbiosis and the relatively isolated system. Symbiosis is the mutually beneficial living together of two systems, neither of which is a subsystem of the other. If the second system performs the subsystem process in exchange for nothing, parasitism exists. If it performs the process in exchange or economic trade-off for some reward or service which constitutes a cost for the first system, symbiosis exists.

The relatively isolated system is a set of entities that is separable from the rest of the world except for two specially chosen sets of relationships with things outside, called its inputs and outputs. According to Beer (1976): "In terms of Hegel's Axiom of Internal Relations, the system is interacting with everything outside. But we certainly would agree to be practical about this and to count relationships which cross the system's boundary only if they appear to matter. That is to say, if we can explain what is happening within the system and managerial options without drawing attention to some entity outside we shall do so."

The open system can be viewed as a transformation model. In a dynamic relationship with its environment, it receives various inputs, transforms these inputs in some way, and exports outputs. Related to this is Ashby's Law of Requisite Variety (1960), which states: "Only variety can destroy variety." Such a view has three possible interpretations: (1) The amount of appropriate selection that can be performed is limited by the amount of available information. (2) The variety in the regulator must be equal to or greater than the variety in the system being regulated. (3) Communications among two or more systems is limited by the system having the smallest variety.

Beer has extended this by saying that: "In cybernetics, the number of distinguishable items (or distinguishable states of some item) is called the 'variety.' So we may sum up by saying that the output variety must (at least) match the input variety for the system as a whole, and for the input arrangement and the output arrangement considered separately."

Similarly, the system's theoretic concept of feedback is important in understanding how a system maintains a steady state. Information concerning the outputs or the process of the system is fed back as an input into the system, perhaps leading to changes in the transformation process and/or future outputs. Feedback can be both positive and negative, although the field of cybernetics is based on negative feedback. Negative feedback is informational input which indicates that the system is deviating from a prescribed course and should readjust to a new steady state.

Models for Organizational Decision Making

Major review articles in the area of organizational decision making have been generated by Nutt (1976) and by Gerwin and Tuggle (1975). Various other authors (c.f., Bonini, 1963; Carter, 1971; Clarkson, 1962; Crecine, 1969; Cyert and March, 1963; Davis and Reuter, 1972; Howard and Morgenroth, 1968; and March and Simon, 1958) have addressed the considerable area of administrative decision making paradigm development. Gerwin and Tuggle (1978) have consolidated this work into the three-way model shown in Figure 1.

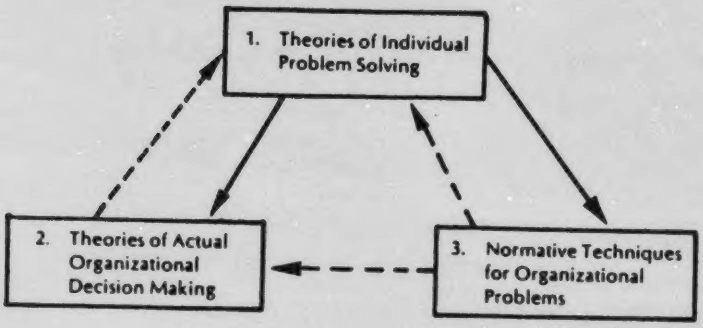

1. Theories of Individual Problem Solving
2. Theories of Actual Organizational Decision Making
3. Normative Techniques for Organizational Problems

FIGURE 1. THE INFORMATION PROCESSING PARADIGM
(from Gerwin and Tuggle, 1975)

This figure is suggested as a schematic which represents the current state of human problem solving research in organizations. It is shown as a triangle, each of whose vertices represents a different subsystem of knowledge. The arrows indicate flows of research findings from one subsystem to another--solid arrows for short run effects and dashed for long run effects. According to Gerwin and Taylor, Vertex One represents theories of individual human problem solving which supply a good deal of the framework for organizational applications. Much of this work has been conducted in laboratory settings and analyzes the ways in which subjects solve problems involving chess, symbolic logic, and cryptarithmetic. Although artificial, these exercises represent well structured problem solving as opposed to routine decision making.

Vertex Two represents organizational applications of the paradigm which explore the ways in which administrative decisions are actually made. Computer models based on this theory or related to it exist for pricing and output determination, trust investment behavior, local governmental budgeting, etc.

Vertex Three represents application of problem solving concepts for design in organizations: finding better ways to make decisions. These decisions are typically well structured, as opposed to the more routine ones for which operations research techniques are available.

According to Gervin and Tuggle, Figure 1 has three long links. The link from Vertex Three to Vertex Two indicates that as organizations adopt heuristic programs, the nature of their decision making will change. The links from Vertices Two and Three to One are feedback loops pointing out that individual problem solving theories will be revised as we learn more about the successes and failures of their organizational applications. Finally, the absence of a link from Vertex Two to Three implies that so far heuristic programmers have not utilized the findings on organizational decision making. However, as they turn their attention to more unstructured normative problems, such as organizational design, this missing link in the flow of research findings may assume major significance.

Nutt (1976) has identified six organizational decision making models. These include:

1. The bureaucratic model, in which decision making is conducted by people with power and competence who interpret master plans.
2. The normative decision theory model, which is characterized by its quest for certainty in decision making and its assumption that goals are known and that information concerning the decision task can be provided.
3. The behavioral decision theory model, which applies behavioral principles to decision making practices.
4. Decision making through group processes, as employed in the human relations movement.
5. The equilibrium-conflict resolution model which functions as a function of uncertainty.
6. The open system model which presumes that most decision tasks are too complicated for typical human understanding processes.

Table 1 (from Nutt, 1976) provides a synopsis of these models.

TABLE 1. COMPARISON OF ORGANIZATIONAL DECISION MAKING MODELS

(from Nutt, 1976)

Models of Organizational Decision Making	Decision Criteria	Key Ingredients	Key Assumptions
CLOSED SYSTEM/DETERMINISTIC			
Model 1: Bureaucratic Model (e.g., Weber, Fayol)	Maximum efficiency	1. Define decision maker's jurisdiction 2. Appoint experts to office and invest power in office holder 3. Rules, procedures, and precedents depict decision premises 4. Refer decisions "up" hierarchy 5. Rewards based on adherence to master plan	1. Goals known 2. Master plan to judge action is a given 3. Tasks repetitive or predictable 4. Environment does not influence choices 5. Resources adequate
Model 2: Normative Decision Theory (e.g., Operation Research theorists)	Maximum subjective expected utility	1. States of nature (S_i) 2. Alternatives (A_i) 3. Probability distribution for S_i 4. Utilities for each A_i-S_i intersection based on how the S_i affects A_i 5. Criteria to determine the intrinsic value of A_i — measured by the properties of A_i and the normative importance of each criterion to the decision maker	1. Goals known 2. Needed information obtainable 3. Adequate resources available 4. Prediction feasible 5. Criteria to judge effects and cause-effect relations are known
Model 3: Behavioral Decision Theory (e.g., Simon)	Satisficing	1. Identifying acceptable S_i and generate A_i until acceptable A_i is found, using normative decision theory model 2. Sequential generation of information concerning A_i 3. Processes: searching, learning, choosing 4. Satisficing replaces optimizing in decision processes	1. Goals can be inferred through domain decisions 2. Environment will not fully disclose all A_i and /or can justify search costs for all A_i 3. Consequences of A_i cannot be fully predicted but some predictions can be made 4. Resources interact with decision processes
Model 4: Group DM (e.g., Collins, Guetzkow, Delbecq)	Satisfice on objectives set by participants	1. *Forming* (membership criteria, information needs and political consideration) for groups composed of clients, content experts, and/or resource controllers 2. *Coalescing* (structure of group process, decision rules, power-influence, interpersonal relations, type of interaction) 3. *Processes* (estimate-discuss-estimate, interacting group techniques, other group processes) 4. *Control* (mechanisms to elicit information group and individual rewards and penalties)	1. Goals consistent with organizations will be used by group to guide choices 2. Interdisciplinary synthesis feasible and multidisciplinary choices acceptable 3. Implementation likelihood enhanced via participation 4. Needed resources and information made available through cooptation

TABLE 1. (CONTINUED)

Models of Organizational Decision Making	Decision Criteria	Key Ingredients	Key Assumptions
Model 5: Conflict-Equilibrium (e.g., March & Simon, Dill, Cyert, Thompson)	Resolution of conflict by consensus	1. The properties of alternatives (when A_is are uncomparable, unacceptable, or uncertain) cause conflict 2. Both group and individual conflict can occur 3. Processes: bargaining, politicking, persuasion and problem solving for conflict resolution 4. Lockian compromise (consensus sought) 5. Contextual factors (e.g., perceptions, rewards, dependencies, cost of search, level of aspiration, coalition formation, and side payments) have a strong influence on choice among A_i's	1. Goals and arena must be defined 2. Organizations seek to reduce conflict 3. Conflict and time pressure will cause the adoption of conspicuous alternatives 4. Further evaluation of existing alternatives will proceed the search for new ideas (new A_i s) 5. Level of aspiration changes vis-a-vis results of search which modifies decision premises
Model 6: Open System (e.g., Gore, Lindblom)	Survival (agency's view) and acceptability (client's view)	1. Partisans with a problem provide stimulus 2. Processes: politics and bargaining generate adaptive incremental responses to problems 3. Constraints: Decision maker not free to choose; must involve clients and other third parties in decision process 4. Control: Use of sentiments, cliques, social norms expressed through a variety of agents to test quality of decisions made through feedback from clients	1. Goals unknown and unknowable in an arena that is unknown or unmanaged 2. Abstractions (models) not precise enough to make decisions 3. Pressures from informal norms greater than formal norms 4. Strong interaction of environment and decisions 5. Reacting better than planning

Nutt has identified 17 propositions for deciding among the six models on the basis of the primary, managerial, and institutional layers of an organization; the nature of the organization's key tasks; the types of dependencies among organizational units; the assessments required between adjacent layers; and some characteristics of the organization's environment. These propositions are as follows.

P1: Closed system logic (Models 1 and 2) is more appropriate for decision making concerning core technologies, as these technologies are sealed off from serious perturbations.

P2: Intermediate system logic (Models 3 and 4) is more appropriate for the managerial level and its coordinating role.

P3: Open system logic (Models 5 and 6) is more appropriate for the institutional level and its boundary spanning role.

P4: When a logical base for decision making has been derived (analyzability high), closed system decision model (1, 2, 3) is more appropriate, and the desirability of using an open system decision model (5, 6) diminishes sharply.

P5: As variability increases, the information needed by closed system decision models will be increasingly hard to obtain and probabilistic in nature, making it difficult to apply Models 1 and 2 for decision tasks.

P6: Proposition 4 dominates proposition 5. High variability makes it hard to use a deterministic decision model, while low analyzability makes it impossible to use a closed system approach for decision making.

P7: Model 6 should not be used for decisions in technological units or in managerial units, as some of the decision premises can always be specified by the institutional level.

P8: The use of decision models is cumulative; increasing cognitive difficulties of decision tasks initiate the use of less precise models (4, 5) along with more definite models, (1, 2, 3), which are used for those decision components that have definable attributes.

P9: The number and type of dependencies among or within organizational units specifies the decision model most appropriate for making decisions concerning the coordination of these units.

P9a: A decision model with bargaining characteristics (Model 5) is best for managerial decision tasks concerning organizational units that have reciprocal dependencies or large numbers of dependencies to induce shared norms and values among these units.

P9b: A group decision model (Model 4) is best for decision tasks when a moderate number of dependencies are present or when dependencies are serial.

P9c: Models with deterministic elements (Models 1, 2, 3) are appropriate for decision tasks that concern pooled dependencies and when dependencies occur infrequently. Models 1, 2, 3 will be more acceptable when coupled with some group process to define decision criteria or weights.

P9d: To delegate decision making by the managerial level to the technological level, the managerial level should require that units with pooled dependencies develop rules and procedures (Model 1), those with serial dependencies should prepare decision plans by indentifying criteria and weights (Models 2 and 3), and those with reciprocal dependencies identify adjustment patterns or group processes (Models 4 or 5) to structure the decision process of these units.

P10: When cause and effect relationships are known and evaluation criteria are clear, optimization should be sought using closed system logic (Models 1, 2).

P10a: When the unit is well insulated from the environment, assessment is typically based on past performance trends, but could be based on closed system logic (Models 1, 2).

P11: When knowledge concerning cause and effect relationships is incomplete but criteria are clear, satisficing and the bounded rationality model (#13) should be used.

P12: Sub-optimization, for parts of the decision task that have predictable cause and effect relationships (using Model 2), is preferable to treating the entire decision task as though cause and effect relationships were uniformly unclear.

P13: When criteria are ambiguous and cause and effect relationships are believed to be clear, checklists (adherence to accepted procedures) provide the evaluation format. Quotas using proxy measures often serve as criteria, suggesting a satisfying decision criterion and intermediate system logic (Models 3 and 4).

P14: When criteria are ambiguous and cause and effect relations are unknown, performance is measured by comparing the unit to a reference group, mimicking the activities of similar organizations that have been labeled successful. Adaptive models (Models 5 and 6) are used.

P15: Decision making at the institutional level in organizations which have a stable and homogeneous environment can be made using closed system logic (Model 1 or 2).

P16: Decision making, at the institutional level, in a shifting but homogeneous environment requires adaptation. Plans are prepared to associate decision premises with anticipated shifts in the product or service characteristics. Thus Models 3, 4, and 5 provide useful decision frameworks.

P17: Decision making at the institutional level in heterogeneous environments which are also shifting is inspirational and adaptive in nature (Model 6).

Models for use in considering organizational decision making paradigms such as those of Gerwin and Tuggle and of Nutt are attempts to discern the strategies and/or tactics involved in changing organizations in response to various temporally fluctuating process demands. Although theoretical approaches in these areas abound, actual empirical research efforts are scarce--due partially to the difficulties involved in (1) operationally defining terms and (2) identifying methodological techniques which are sufficiently flexible to permit their application in essentially unstructured research situations, yet which are sufficiently precise to allow for reproducible results.

B. RESEARCH

Processing Demand in Individuals and Small Groups

Streufert and associates have utilized a simulation procedure to determine the effects of individual differences in cognitive ability to differentiate and integrate on various measures of output quality. The system, in much of that research, was an individual or a task-oriented group of 2, 4, or 8 members. Diverse levels of information processing demands were experimentally manipulated. Processing demand was varied as information load (Streufert and Driver, 1965; Streufert and Schroder, 1965; Streufert, 1970; Streufert, Suedfeld and Driver, 1965; Streufert, Driver and Huan, 1967; Streufert, Cafferty and Cherry, 1972; Suedfeld and Streufert, 1966), as failure (Castore and Streufert, 1966; Streufert and Castore, 1968; Streufert, 1969; Streufert and Streufert, 1969; Streufert and Streufert, 1970[a]; Streufert and Castore, 1971), as success levels (Streufert and Castore, 1968; Higbee and Streufert, 1968; Streufert and Streufert, 1969; Streufert and Streufert, 1970[a]; Streufert, 1972) and as information relevance (Streufert and Streufert, 1970[b];

Streufert, 1973). A number of dependent variable measurements were obtained in these research studies. Measures of quality and quantity of system output (including differentiation and integration evident in the output decision, number of decisions, number of information search actions) were obtained. Other research efforts focused on additional organizational variables such as leadership characteristics, organizational climate, and so forth. The findings indicate that: (1) Complex systems (which are able to differentiate and integrate) show a widely different style of processing information than simple systems. (2) The inverted U-shaped curve postulated between information processing demand and output quality holds reliably. (3) The family of postulated U-shaped curves can be easily demonstrated and shows reliable peak points. (4) Differences in processing style result in quite diverse management activities, e.g., different styles of leadership and different communication and attraction patterns. Therefore, at the individual or group level, complexity theory postulates seem reliably validated.

Processing Demand in Organizations

A number of researchers have investigated the effects of processing demands on organizational functioning. While only some have based their research on complexity theory *per se* (e.g., Suedfeld, 1978; Cummings, O'Connell and Huber, 1978), the data obtained nonetheless often fit the propositions of that theory and related contingency theories. For example, Fiedler, Potter, Zais, and Knowlton (1979) reported four studies of military organizations which indicate that low stress levels decrease the use of experiential data, while high stress levels decrease the utilization of intelligence in organizational actions. Intermediate stress levels appear optimal if both are needed. Suedfeld and associates (e.g., Suedfeld and Rank, 1976) have shown that the international system is able to tolerate a certain degree of stress, and that stress beyond that level leads to war or loss of power for the leaders of nations. Driver (1962) obtained similar data. Drabeck and Haas (1971), utilizing load as their processing demand variable, reported results with a police organization that match the theoretical propositions of complexity theory as well. Many similar examples could be cited. However, one should note that most researchers have varied processing demands only over a limited range so that either decreases or increases in systemic performance and functioning with increasing demands are obtained. The detrimental effect of increases in processing demands (beyond an optimum level) has been clearly established. To quote Bourgeois, McAllister and Mitchell (1978):

> "...there is a substantial body of literature (Hall and Mansfield, 1971; Selye, 1956) that suggests that most managers would respond to turbulent environments in a manner opposite to that which is predicted to lead to greater effectiveness. Managers may respond to increased environmental turbulence by an increase in structure, possibly followed by a relaxation of controls once the 'danger' has subsided. The reasoning is that turbulence causes uncertainty or stress which leads to attempts to reduce that uncertainty or stress by structuring the organizational setting. The research on organization and individual stress seems to support this tendency (Bales, 1965; Fleischman, Harris and Burtt, 1955; Hall and Mansfield, 1971)."

Data on the range of processing demands between low and optimal levels are ample as well. Here, increasing performance of the system, improved output, and so forth tend to be demonstrated as processing demands approach the optimal level. What is optimal for a particular organization would depend, of course, on the structure of that organization and on the degree to which the processing demands would require complexity (e.g., differentiation and integration). Typically, data of this kind are discussed in terms of approaching the "limits of the individual manager's or the organization's information processing capacity" (c.f., Freeland and Stabell, 1978).

Of course, in contrast to the individual who would find it extremely difficult to increase his or her dimensionality (ability to process information in a differentiated or integrated fashion) over the short run, the organization can alter its structure to cope more effectively with increasing processing demands. More often than not, complex systems will evolve from simpler systems (c.f., Simon, 1965) when there is a need for increased differentiation of the organization.

2. FACTOR II: ORGANIZATIONAL SYSTEMS DYNAMICS

The variables included in this factor represent characteristics of an organizational system relative to its adaptation and flexibility as it copes with its environment, attempts to maintain a relative steady state or balance, and utilizes its resources to grow. This factor represents, to a large extent, the systems theoretic perspective of the organization.

A. THEORETICAL BACKGROUND

Systems Theory as a Conceptual Referent

Systems theory is the generic terminology embracing the General System Theory (GST) first formulated by Ludwig von Bertalanffy and its subsequent refinements or extensions -- the Living Systems Theory of Miller (1965, 1971, 1972, 1978) and the Sociotechnical Systems concepts of Emery and Trist (1960, 1965, 1978).

GST has been characterized perhaps best and most succinctly as "the scientific exploration of 'wholes' and 'wholeness'" (Laszlo, 1972). In his initial formulations, von Bertalanffy (1962) stated:

> "There exist models, principles and laws that apply to generalized systems or their subclasses irrespective of their particular kind, the nature of the component elements, and the relations or "forces" between them. We postulate a new discipline called General System Theory. General System Theory is a logico-mathematical field whose task is the formulation and derivation of those general principles that are applicable to "systems" in general. In this way, exact formulations of terms such as wholeness and sum, differentiation, progressive mechanization, centralization, hierarchical order, finality and equifinality, etc., become possible, terms which occur in all sciences dealing with "systems" and imply their logical homology."

In 1954, the Society for General Systems Research (initially named the Society for the Advancement of General System Theory) was born. Interestingly, the organization's founding fathers-- von Bertalanffy from biology, Kenneth Boulding from economics, Ralph Gerard from physiology, and Anatol Rapoport from mathematical network theory--numbered among themselves neither a psychologist nor a sociologist. Yet, the original aims of the Society protended grand, and theretofore unattained, expectations:

> "Major functions are to: (1) investigate the isomorphy of concepts, laws, and models in various fields, and to help in useful transfers from one field to another; (2) encourage the development of adequate theoretical models in the fields which lack them; (3) minimize the duplication of theoretical effort in different fields; (4) promote the unity of science through improving communication among specialists" (von Bertalanffy, 1972).

In somewhat altered form, this same philosophical orientation found its way into the first issue of the Society's Yearbook in 1956 as a set of propositions that collectively seem to capture the essence of what GST was intended to accomplish:

- "There is a general tendency towards integration in the various sciences, natural and social.
- Such integration seems to be centered in a general theory of systems.
- Such theory may be an important means for aiming at exact theory in the non-physical fields of science.
- Developing unifying principles running 'vertically' through the universe of the individual sciences, this theory brings us near to the goal of the unity of science.
- This can lead to a much needed integration of scientific education" (von Bertalanffy, 1972).

Thus, what began as an attempt to overcome over-compartmentalized research and piecemeal analysis by "seeing things whole" has continued to this day to be the raison d'etre of the systems movement. As such, an extremely high level of expectation has been created, which in turn has engendered harsh and critical analysis at the inability of the systems approach to provide answers to some of our most complex problems (see, for example, Beckett, 1979, and Small, 1980). One source (Melcher, 1975) has identified a number of factors that have inhibited the development and use of systems theory:

- "the limited critical dialogue that occurs both among systems adherents and between those utilizing traditional perspectives and those using systems frameworks;
- the diffuseness of definitions of systems concepts and the nearly complete absence of ways to measure those concepts;
- the overreaching for goals before basic foundations have been established;
- the orientation that a systems perspective is a substitute for rather than a complement to static analysis; and,
- the difficulty of developing methodology to describe and analyze complex interrelationships in dynamic models."

In the present context, such criticisms provide a preliminary benchmark for assessing the comprehensiveness and appropriateness of systems theory as a referent for organization theory in general and OE/OD research in particular. The ultimate question that must be asked, of course, is "what should systems theory be? a paradigm? a theory? or merely a metaphorical way of viewing the world and its constituent parts?" In endeavoring to anwer such a question, it is necessary first to clarify the meanings of the terms used and to attempt to establish the current status of systems theory.

Some have contended that systems theory is in fact worthy of paradigmatic status (Peery, 1972; Scott, 1974). Battista (1977) has suggested that we are on the verge of a paradigm shift -- in keeping with the contention of Kuhn (1970) that science is a series of peaceful periods interrupted by intellectually intense revolutions. The emergent "holistic" paradigm, according to Battista, constitutes the basic assumptions of general systems theory, and general systems theory constitutes the theoretical formulation of holistic assumptions. To judge the likely validity of such a statement, one must understand what is meant by paradigm. Some have used the term rather cavalierly as a synonym for a conceptual model; in contrast, probably the most inclusive and useful definition has been offered by Masterman (1970):

> "A paradigm is a fundamental image of the subject matter within a science. It serves to define what should be studied, what questions should be asked, how they should be asked, and what rules should be followed in interpreting the answers obtained. The paradigm is the broadest unit of consensus within a science and serves to differentiate one scientific community (or subcommunity) from another. It subsumes, defines, and interrelates the exemplars, theories, and methods and instruments that exist within it."

In light of the criticisms that have been levied against it, systems theory seems hardly to have attracted the scientific consensus or to have provided the methodological tools necessary to qualify it for paradigmatic status. Likewise, if one accepts the arguments of Anatol Rapoport, there is adequate reason to question that systems theory has achieved even the status of a theory, as that term currently is defined by the scientific community. "General systems theory is best described not as a theory in the sense that this word is used in science but, rather, as a program or a direction in the contemporary philosophy of science" (Rapoport, 1968).

Rapoport has suggested different meanings for theory. For the exact (or natural or physical) sciences, theory is a collection of derived theorems tested in the process of predicting events from observed conditions. For the social sciences, theory is fundamentally metaphorical, since such "sciences" by their very nature can only attempt to achieve and impart intuitive understanding of social behavior, institutions, cultures, etc. He pointed out, however, that metaphor and analogy, although they cannot be accepted as scientific "explanations," are sometimes important aids in the sense that they prepare the mind to make more precise investigations. It is in this sense that the so-called "models" of the non-exact sciences are to be appreciated (Rapoport, 1968).

Even if the best that systems theory is able to claim is the status of a metaphorical framework, it seems not inappropriate to expect that, in light of its title and the grand expectations it has generated, it be supplemented as necessary to achieve at least theoretical status. Most sources agree that the essential criteria for any theory are essentially threefold: First, the theory should stipulate all of the factors that are relevant to the subject at hand; second, it should provide an explanation of why or how these factors are relevant; and, third, it should be testable and confirmed by the available evidence. (See, for example, Reynolds, 1971, and Nagel, 1961.)

For purposes of this discussion, it will suffice here to address just the first of these criteria: i.e., the extent to which systems theory accounts for all of the factors that are relevant to organizational performance.

At the most fundamental level, a system is defined as a complex of mutually interacting parts or components (von Bertalanffy, 1962; Ackoff, 1960). Miller (1978) has defined three kinds of systems: conceptual, concrete and abstracted. Living systems, in turn, constitute a subset of concrete systems that must meet eight criteria (Miller, 1978):

- The system must be open and exchange commodities with its environment.
- It must be able to repair internal breakdown and thereby maintain certain levels of energy and order.
- It must be complex beyond a minimum degree.
- It must evidence some program, template, or originating blueprint.
- It must be composed largely of protoplasm.
- It must contain a decider subsystem.
- In order for it to survive, 19 critical subsystem processes must be carried out.
- It must be an integrated totality with the characteristic of self-regulation, the capability of development and reproduction, and the trait of having purposes and goals.

Both Miller (1978) and Boulding (1956) identified various levels that comprise a systems hierarchy. Miller's levels are (1) the cell, (2) the organ, (3) the organism, (4) the group, (5) the organization, (6) the society, and (7) the supranational system. Boulding delineates nine levels: (1) frameworks, (2) clockworks, (3) thermostat, (4) cell, (5) plant, (6) animal, (7) human, (8) social organizations, and (9) transcendental systems.

Boulding noted that at his eighth, or organizational, level, "we must concern ourselves with the content and meaning of messages, the nature and dimensions of value systems, the transcription of images into historical record, the subtle symbolizations of art, music, and poetry, and the complex gamut of human emotion" (Boulding, 1956).

Rapoport and Horvath (1959) have distinguished between organization theory and the "theory of organizations." They saw the former as dealing with general and abstract organizational principles; it applies to any system exhibiting organized complexity. As such, it is seen as an extension of mathematical physics or, even more generally, of mathematics designed to deal with organized systems. The theory of organizations, on the other hand, purports to be a social science. It puts real human organizations at the center of interest. It may study the social structure of organizations and so can be viewed as a branch of sociology; it can study the behavior of individuals or groups as members of organizations and so can be viewed as a part of social psychology; it can study power relations and principles of control in organizations and so be fit into political science.

One of the most forceful early articulations of the systemic view of the organization was that of Katz and Kahn in their book The Social Psychology of Organizations (1966). They viewed the organization as an energic input-output system and suggested two criteria for identifying social systems and determining their functions: (1) tracing the pattern of energy exchange or activity of people as it results in some output, and (2) ascertaining how the output is translated into energy which reactivates the pattern.

It is interesting to note that Katz and Kahn, in the preface of their book, attributed the origins of their work to the human relations research of Rensis Likert. They contended that the previous literature largely had ignored "the great central area of man's behavior in organizations and institutions and the psychological character of such groups." Yet, they referred to organizational functions or objectives not as the conscious purposes of group leaders or group members but, in systemic terms, as "the outcomes which are the energic source for a maintenance of the same type of output."

For the most part, those efforts that have been made within the systems theoretic framework to deal with various social groupings have tended to try to reinterpret or redefine traditional concepts into systems terminology rather than to adapt systems theory to the organizational or social context. This is exemplified in the works of Buckley (1967) and Kast and Rosenzweig (1979). Johnson, Kast and Rosenzweig (1973), for example, have asserted:

> "The systems concept is primarily a way of thinking about the job of managing. It provides a framework for visualizing internal and external environmental factors as an integrated whole. It allows recognition of the function of subsystems, as well as the complex supersystems within which businessmen must operate. The systems concept fosters a way of thinking which, on the one hand, helps to dissolve some of the complexity and, on the other, helps the manager to recognize the nature of complex problems and thereby to operate within the perceived environment."

Most such treatments have concentrated on what have come to be the dominant concepts of systems theory: subsystems or components; holism, synergism, organicism, and Gestalt; the open systems view; input-transformation-output; system boundaries; negative entropy; steady state, dynamic equilibrium, adaptability, and homeostasis; growth; feedback; hierarchy; internal elaboration; multiple goal-seeking; and equifinality. The discussion of Factor II focuses on five of these concepts: open systems, subsystems, adaptability, equilibrium, and growth.

Open vs. Closed Systems

The notion of "open" and "closed" systems has been approached from two perspectives: as a system attribute and as a theoretical orientation. In the first perspective, "openness" and "closure" refer to the structural characteristics of the organization. The extent to which a system is open or closed is determined by the permeability of its boundaries and the mutuality of its relationships (Beer, 1976). In this context, systems at any level of analysis--individuals (Allport, 1960; Menninger et al., 1963), groups (Miller, 1964; Ziller, 1965), and organizations (Katz and Kahn, 1966; Miller and Rice, 1967)--can be described as being more or less open. In the organizational literature, moreover, there has been a tendency to distinguish open and closed systems with a somewhat different nomenclature--specifically, organic and mechanistic (Burns and Stalker, 1961). Here too, the distinction is based on boundary and relationship conditions:

	Organic (Open)	Mechanistic (Closed)
Boundaries	More permeable	More impermeable
Roles	Defined by nature of task and individual competencies	Precisely defined
Interaction	Horizontal and vertical; consultation over command	Primarily hierarchical

In the second perspective, the concepts of "open" and "closed" systems are used to distinguish not between systems, but between theoretical orientations to systems (Mott, 1972; Negandhi, 1975). Openness and closure here denote two polar views of organizations. The distinguishing feature of these perspectives is the consideration given to the effects of the environment on the organization.

> "Adherents of the closed system perspective tend to set aside or to give inadequate consideration to the effects of the environments in which organizations exist; they concentrate instead on internal workings. The open approach starts with an opposite assumption: as organizations exist in dynamic environments, their functions can be understood best by taking these environments into account"(Mott, 1972).

The purpose of noting this dual use of open and closed systems in organizational theory is to point out that there are two loci of openness: inherent in the structure of the organization and/or inherent in the theoretical framework of the individual.

Katz and Kahn (1966) identified nine characteristics which define all open systems and specified the nature of these factors in the organizational system:

> "1. Importation of Energy - Organizations must draw renewed supplies of energy from other institutions, or people, or the material environment. No social structure is self-sufficient or self-contained.
>
> 2. Through-Put - Open systems transform the energy available to them. The organization creates a new product, or processes materials, or trains people, or provides a service. These activities entail some reorganization of input.
>
> 3. Output - Open systems export some product into the environment, whether it be the invention of an inquiring mind or a bridge constructed by an engineering firm.
>
> 4. Systems as Cycles of Events - The pattern of activities of the energy exchange has a cyclic character. The product exported into the environment furnishes the sources of energy for the repetition of the cycle of activities. The energy reinforcing the cycle of activities can derive from some exchange of the product in the external world or from the activity itself. In the former instance, the industrial concern utilizes raw materials and human labor to turn out a product which is marketed, and the monetary return is used to obtain more raw materials and labor to perpetuate the cycle of activities. In the latter instance, the voluntary organization can provide expressive satisfactions to its members so that the energy renewal comes directly from the organizational activity itself.
>
> 5. Negative Entropy - To survive, open systems must move to arrest the entropic process; they must acquire negative entropy. The entropic process is a universal law of nature in which all forms of organization move toward disorganization or death. The open system, however, by importing more energy

from its environment than it expends, can store energy and can acquire negative entropy. There is then a general trend in an open system to maximize its ratio of imported to expended energy, to survive and even during periods of crisis to live on borrowed time. Social organizations will seek to improve their survival position and to acquire in their reserves a comfortable margin of operation.

6. Information Input, Negative Feedback, and the Coding Process - Inputs are also informative in character and furnish signals to the structure about the environment and about its own functioning in relation to the environment. The simplest type of information input found in all systems is negative feedback. Information feedback of a negative kind enables the system to correct its deviations from course.

7. The Steady State and Dynamic Homeostasis - The importation of energy to arrest entropy operates to maintain some constancy in energy exchange, so that open systems which survive are characterized by a steady state. A steady state is not motionless or a true equilibrium. There is a continuous inflow of energy from the external environment and a continuous export of the products of the system, but the character of the system, the ratio of the energy exchanges and the relations between parts remains the same.

   In adapting to their environment, systems will attempt to cope with external forces by ingesting them or acquiring control over them. The physical boundedness of the single organism means that such attempts at control over the environment affect the behavioral system rather than the biological system of the individual. Social systems will move, however, towards incorporating within their boundaries the external resources essential to survival. Again the result is an expansion of the original system.

> Thus, the steady state which at the simple level is one of homeostasis over time, at more complex levels becomes one of preserving the character of the system through growth and expansion. The basic type of system does not change directly as a consequence of expansion.
>
> 8. Differentiation - Open systems move in the direction of differentiation and elaboration. Diffuse global patterns are replaced by more specialized functions. Social organizations move toward the multiplication and elaboration of roles with greater specialization of function.
> 9. Equifinality - Open systems are further characterized by the principle of equifinality, a principle suggested by von Bertalanffy in 1940. According to this principle, a system can reach the same final state from differing initial conditions and by a variety of paths."

The Katz and Kahn framework is representative of the general systems view of organizational characteristics and processes (see also Boudling, 1956; DeGreene, 1974; Laszlo, 1972; Steers, 1977).

Katz and Kahn (1966) pointed out several misconceptions which they believed could arise in organization theory and practice when organizations are regarded as closed rather than open systems:

> 1. Failure to recognize that because the organization is dependent upon inputs from the environment--which are not a constant--its efforts to maintain a constant environment often produce changes within the organizational structure.
> 2. Failure to recognize the principle of equifinality governing the organization, namely that there are several ways to produce the same outcome.
> 3. Failure to recognize that environmental influences are not sources of error variance in research studies, but are integrally related to the functioning of the system and necessary to an understanding of it.

4. Failure to recognize, in practice, the importance of obtaining feedback about changes in environmental forces during planning and forecasting operations.

However, while openness and organicism appear to relate to organizational viability and effectiveness, highly closed, mechanistic systems do exist and prosper. In fact, Schein and Greiner (1977) noted that "the preponderance of evidence...shows that bureaucratic structures are still the dominant organizational form". Alderfer (1976) cited two possible reasons for the viability of closed systems:

1. The closure is offset by violent explosions within the system (Sykes, 1958; Stotland and Kohler, 1965).
2. Internally closed systems complement their overtly impermeable boundaries with covert openness (e.g., sarcasm, satire, unauthorized behaviors across boundaries)(Sykes, 1958; Alderfer, 1972; Goffman, 1961).

Bennis (1965, 1966, 1969), in his earlier works, wrote that bureaucratic, mechanistic structures should be replaced by organic ones built on openness and trust. Closed, mechanistic structures, he believed, were antithetical to the ideals of growth and development. However, after experiencing the realities of organizational life as an administrator in two academic institutions, Bennis (1970) revised his views and became much more tolerant of the bureaucratic structure.

Schein and Greiner (1977) proposed two possible explanations to the question of why organic (open) structures have not been adopted universally. One explanation is that offered by Bennis (1970): unenlightened managers are simply resistant and slow to change. While the ideal situation is the replacement of bureaucratic structures with ones built on openness and trust (Bennis, 1969), reality proves man to be more concerned with power and profit and less with trust and warmth (Bennis, 1970). A very different explanation is offered by the structural contingency theorists (e.g., Burns, Stalker, Woodward, Lawrence, Lorsch, and Morse). They approach closed systems in terms of the organization's fit between its structure and external environment. In this light, mechanistic (closed) structures are not only appropriate for relatively stable environments (Burns and Stalker, 1961) and routine technologies (Woodward, 1965), but, in fact, are more conducive to high performance than organic (open) structures in the same environment.

Burns and Stalker explained their findings by noting that under stable conditions organizations face relative certainty and thus can evolve highly efficient static structures and standardized procedures for dealing with demands placed upon them. However, when the organization confronts an unstable, uncertain environment, it cannot standardize procedures because the problems are unique and themselves changing. In a situation such as this, the organization must be able to develop new and unique patterns of response at a fairly continuous rate. To the extent that the organization is flexible, it can survive these conditions.

Thompson (1967) expanded on Burns and Stalker's approach with the notion of boundary spanning units. These units insulate the technical core from environmental uncertainty, thereby allowing it to achieve some degree of stability. The structuring of boundary spanning units is dependent on the degree of stability (degree to which the task environment changes over time) and homogeneity (degree to which the task environment is differentiated). Relating the concept of boundary-spanning units to the typology of technologies developed by Woodward, Thompson draws the following generalizations:

TABLE 2. CONTINGENCIES AFFECTING OPENNESS AND FLEXIBILITY OF ORGANIZATIONAL STRUCTURE.

Technical Core	Flexibility Needs	Structure	Coordination
Mediating	Low	Rigid	Standardized Procedures
Long-linked	More	Less Rigid	Quotas and Schedules
Intensive	Most	Flexible	Stress and Individual Discretion

Mott (1972) noted that there are certain inadequacies with both the open-system and closed-system perspectives. While the closed-system approach tends to treat inadequately the problems presented to the organization by its environment and employees, the open-system approach tends to give inadequate attention to the importance of productivity and the utility of structures designed to achieve it. Believing that there are theoretically and practically useful concepts in both views, Mott attempted to synthesize them into a general model of organizations. The basic assumption of his model was that "the degree of organizational closure is an important variable mediating many of the relationships between other organizational properties and organizational effectiveness". Organizations are not viewed, therefore, as either totally open or completely closed, but instead as:

> "collections of centers of power in varying degrees of centralization, related to one another through interfaces that vary in degree of organization and directness of connection. Internal structure is constantly being created and destroyed by the twin functions of formal coordination and informal negotiation. Organizations are thus in permanent flux, but the amount of this flux varies from one organization to another. As roles and relationships become increasingly structured, the organization becomes more and more impervious to its environment--unless it develops special units with the specific function of scanning the environment and informing organizational leaders of their findings" (Mott, 1972).

Subsystems

The standard treatment of organizational components usually has defined different departmental structures with the concepts of "line" and "staff." Since the advent of systems theory, however, a general reorientation has occurred in much of organizational theory. The organization per se is treated as a system, and its components as subsystems. Katz and Kahn (1966) used this term because, among other reasons, it provided a way to conceptualize a broad range of different organizations in a common framework.

Five major subsystems are identified in the literature. While the names vary somewhat, they can be classified as follows: (1) Production/Technical subsystems, (2) Supportive/Boundary-Spanning subsystems; (3) Adaptive subsystems; (4) Maintenance subsystems; and (5) Managerial subsystems (Katz and Kahn, 1966; Miller, 1965, 1971; Steers, 1977). These subsystems have also been categorized as either primary or collateral. While all subsystems must function to some degree of effectiveness in order for the organization to survive, some are more actively involved in the "vital" processes of resource acquisition, production and distribution than others. Those subsystems which "make the system go," by producing the marketable item, operating in the external environment to obtain information and inputs and exchange outputs are called primary subsystems. These include the production/technical, supportive/boundary-spanning and adaptive subsystems.

To insure the effective operation of the primary subsystems, there must be other simultaneous supporting and coordinating activities. Carrying out these functions are the collateral subsystems--maintenance and managerial. Their chief purpose is to insure smooth relations among other subsystems. While these two types of subsystems can be distinguised functionally, it is obvious that individuals and/or units can be members of more than one type of subsystem simultaneously (i.e., the production manager).

Following is a brief description of each subsystem and its impact on the organization (Carroll and Tosi, 1977; Katz and Kahn, 1966):

1. Production/Technical Subsystems. These subsystems are concerned with the throughput, or information transformation, associated with the work that gets done. They represent the technical core of the organization responsible for producing the product or service offered by the organization (Thompson, 1967).
2. Supportive/Boundary Spanning Subsystem. These subsystems carry on the environmental transactions in procuring the input or disposing the output. Persons responsible for these transactions are referred to as boundary-role persons (BRP) and are critical in the areas of sales, marketing, purchasing, public relations, and recruiting (Aldrich and Herker, 1977; Leifer and Delbecq, 1976).

3. Adaptive Subsystems. These subsystems are concerned with sensing relevant changes in the outside world and translating the meaning of those changes to the organization. A detailed review of the adaptation process is given in a later section of this chapter.

4. Maintenance Subsystems. These subsystems generally are concerned with insuring predictability and the smooth operation of the rest of the organization. Two principle functions are involved: (1) to set and monitor adherence to performance standards for tasks, raw materials, product/service quality and technical machinery/processes; and (2) to maintain morale through indoctrination, socialization, rewarding/punishing, training and overseeing the compensation and performance appraisal systems.

5. Managerial Subsystems. These subsystems are concerned with controlling, coordinating and directing the subsystems of the organization. Two major types can be distinguished: authority structure, which defines the way in which the managerial system is organized with respect to its sources and implementation of decision making; and regulatory mechanisms, which give feedback to the system about its output in relation to its input.

The total system, conceived as the interaction of primary and collateral subsystems, is illustrated in Figure 2.

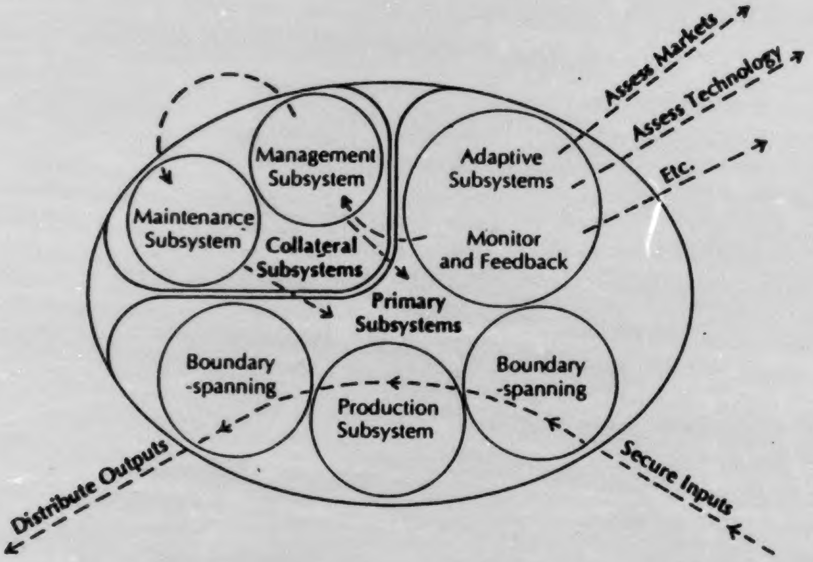


FIGURE 2. THE TOTAL SYSTEM
(from Carroll and Tosi, 1977)

Adaptation-Adaptability

Sagasti (1970) has provided probably the most complete treatment of the subject of adaptation and adaptability. He defined two types of adaptation: structural and functional. A system displays structural adaptation when the following condition is satisfied:

> "One or more modification(s) of the system's defining elements (E) and or relations (R) which affect the system's potential production of Y, generate one or more changes in (E) and/or (R) such that the Y producing property of the system is preserved with at least the same level of efficiency. The initial structural modification(s) is (are) called 'stimulus' and the subsequent ones 'response'" (Sagasti, 1970).

Similarly, a system displays functional adaptation when the following condition is satisfied:

> "One or more modifications of the system's defining elements (E) and/or relations (R) generate a change in the function of the system, so that it will produce a different class of entities Y_1; these are more compatible with the new structure of the system in the sense that, after the initial modification of structure, the number of states of the system producing Y_1 becomes greater than the number of states producing Y. Therefore, after the stimulus, the efficiency of the system as a potential producer of Y_1 is greater than its efficiency as a potential producer of Y" (Sagasti, 1970).

Sagasti classified adaptive behavior first from the structural point of view. He did so by establishing the relationship between stimulus (which may be either external or internal) and response (which may be either Darwinian or Singerian). Darwinian-External Adaptation is the most widely studied type of adaptation. An organizational example of this type of adaptation is when an organization changes within (object) in order to adapt to changes in the external environment. Darwinian-Internal Adaptation has both the disturbance and the modification taking place within the object. A biological example occurs within the human body when the malfunction of one organ causes its function to be assumed by another organ. Singerian-External Adaptation is where both stimulus and response occur in the environment, as in a thermostat where a change in the temperature of the environment causes the thermostat also to change. Singerian-Internal Adaptation occurs when the stimulus comes from within the object and the response is oriented toward changing the environment, as when a person with a high fever (internal) changes the room temperature (environment).

In classifying functional adaptation, Sagasti used Ackoff's (1971) interpretation of systems as either goal-seeking, purposive, or purposeful. He further differentiated homogeneous systems, in which the function of the elements of the system is to serve the function of the whole, and heterogeneous systems, where the functions of the elements are served by the function of the whole. In Homogeneous-Goal-seeking Systems, there is no choice in the selection of a response to a stimulus, and the elements serve the function of the system. An example is an organism whose sole function is to survive -- the elements of which are geared toward performing that function. In the Homogeneous-Purposive System, on the other hand, the function of the elements is to serve the functions of the system, but the system is able to choose a response to a given stimulus. An example might be a religious organization or a sports team where the members set aside their own motives and ambitions to further the goal of the organization. The Heterogeneous-Goal-seeking System is a strange combination where the system function is to serve the functions of the individual elements but has no choice in selecting its responses to stimuli. This is not a particularly meaningful category. The purpose of the Heterogeneous-Purposive System is to serve the functions of its elements, but the system has choice in selecting responses. Examples include community organizations and educational institutions.

Sagasti further defined a "purposeful" system as follows: "a system whose function is to produce a particular set of entities, Y, is purposeful if, during the adaptation process, it can change its function from producing Y to producing another kind of entities Y_1." Only purposeful systems can display functionally adaptive behavior; however, though purposeful systems can change their function, they need not do so in response to every stimulus. Finally, a Functionally Adaptive System is a purposeful system which displays functional adaptation. Organizations that change their objectives in response to any type of stimulus belong in this category.

Leavitt, Dill and Eyring (1973) distinguished between two types of adaptation: responsive and active. In the former case, the organization attempts to adapt to any environment, regardless of the conditions that exist there. Many potential dangers arise in this situation, both practical and ethical. In the latter case, the organization changes itself to meet the demands of the environment, but at the same time attempts to alter that environment. While this situation typifies many organizations whose prime purpose is to "change their worlds," it too poses several dilemmas. The principal problem for the organization in this case is to achieve a blend of action and adaptation which allows the organization to maintain its own identity, change its environment, and yet remain a part of it.

Most of the literature on organizational change and development assumes a reactive model of adaptation. As shown in Figure 3, adaptation is a stage in the overall process of change in which the organization reacts or responds to environmental demands (Hrebiniak, 1978). Conceived in this way, adaptation constitutes a reaction to various kinds of external cues.

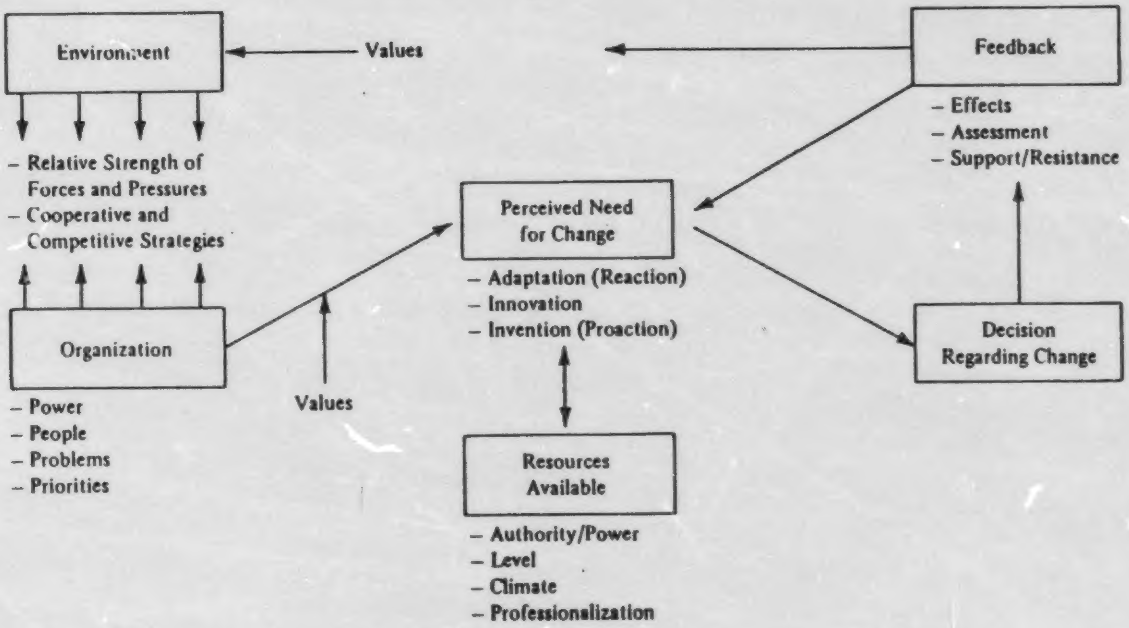


FIGURE 3. THE ADAPTATION STAGE OF THE ORGANIZATIONAL CHANGE PROCESS (from Hrebiniak. 1978)

Lawrence and Lorsch (1969) emphasized differentiation and integration in their treatment of organizational development. According to their view, the degree of differentiation appropriate for the organization is determined by the environmental demands placed upon it. To the extent that the environment is certain (or stable), the level of differentiation will be low. As the degrees of certainty vary, the organization will require more differention. Adaptation--through varying the level of differention--is, in this model, a reaction to the level of certainty in the environment.

Similarly, Thompson (1967) defined adaptation in reactive terms in his technological model. He argued that organizational structure in terms of (1) decentralization, (2) the number of boundary spanning units necessary to monitor the environment, and (3) emphasis on rules and responses for adaptation depends on the homogeneity and instability of the environment.

Schein (1970) also reflects an orientation toward the reactive nature of adaptability. The principal functions he attributed to adaptation--sensing, communicating information, and changing--represent the organization's ability to sense changes in the environment and respond to them. Generalizing from the literature surveyed, therefore, the vocabulary of adaptation appears to emphasize "adjusting," "responding," "coping," and "reacting."

Innovation adoption has been characterized as a mode of "reactive" adaptation which implies a somewhat more active function. In a review of the literature on organizational innovation adoption, Ross (1974) concluded that the literature

> "lacks consensus on even a few major conditions affecting innovation adoption, has not worked with care on the indicators of adaptability, and generally fails to test its observations using models, such as mathematical models, relating environmental and internal conditions to organizational behavior in adoption performance."

However, Ross was able to identify in the existing literature seven models of innovation adoption by organizations, as follows:

1. The "strong leadership" model - adopt innovations under the direction, and insistence if necessary, of the administrative head or functional head of the target organization.
2. The "rational change process" or "management by objectives" model - adopt innovations by having the target organization (1) sense problems or needs or state objectives and priorities, (2) develop alternative solutions, (3) evaluate alternatives using specified criteria, (4) select and adopt one alternative, and (5) follow up to observe achieved results.
3. The "response to a need" or "squeaking wheel" model - adopt innovations only after a need or problem, located either in the market or in the organization itself, is clearly recognized; then tailor the innovation to the need.
4. The "internal change agent" or "organization development" model - adopt innovations as a consequence of the active influence of one or several people working in the target organization who facilitate communication and group attention to group objectives, to produce continuing attention to adoption of a particular innovation or or innovations in general.
5. The "adopting competitive practice" or "lighthouse" model - adopt innovations by observing a demonstration of the practice in a similar organization, then modify or copy it for use in the target organization.
6. The "outside agent" model - cause the adoption of innovations by creating an agency outside the target organization whose special role is to introduce innovative practices in the target organization, usually through consultative practices or through requirements of law.
7. The "incentives for change" model - make changes by offering financial support of a temporary or continuing kind on the condition that the target organization adopts a specified innovation.

Ross examined 30 schools to test the validity of these models as a description of innovation adoption. His findings showed that "no existing model of the process by which organizations adopt new practices was general enough to reasonably fit...a major fraction of the innovation adoption histories" studied. In response, Ross developed a general model of innovation adoption which stated that "adoption climate, and therefore adoption performance (a), is a function of initiating (I) and sustaining (S) mechanisms". Initiating mechanisms carry new ideas into the organization, while sustaining mechanisms create an internal environment which is favorable to their survival. Feedback mechanisms within the organization facilitate the communication necessary for this process. A correlation analysis was used to demonstrate the validity of this model. Further research replicating these findings was recommended.

There is a small body of literature which stresses the proactive nature of organizations. A detailed discussion of this concept and its treatment in the literature is provided by Weick (1969). According to this view:

> "..(O)rganizations are always proactive. They create and constitute the environment to which they react; the environment is put there by the actors within the organization and by no one else. This reasserts the argument that the environment is a phenomenon tied to processes of attention, and that unless something is attended to it doesn't exist" (Weick, 1969).

Katz and Kahn (1966) defined the adaptive functions of the organization as the means by which the system actively maintains a steady state--the equilibrium requisite for survival.

> "The adaptive function...is directed toward the survival of the organization...(It) moves in the direction of preserving constancy and predictability in the conditions of organizational life. (While) the maintenance function moves toward a constant set of internal structures, (t)he adaptive function tends to achieve environmental constancy by bringing the external world under control" (Katz and Kahn, 1966).

The adaptive function can operate in two directions: it can strive to attain control over external forces to maintain an internal status quo (reactive) or it can seek internal modification of its own structures and processes to meet the demands of a changing environment (proactive). Katz and Kahn (1966) placed higher priority on the former mechanism:

> "The hypothesis seems tenable that the dominant tendency will be to seek control over the environment rather than to modify internal structures to accord with external changes. The organization thus will proceed on the principle that it is easier to make the world adjust than it is to adjust to the world, and the latter alternative will be adopted only if the first offers small hope for success" (Katz and Kahn, 1966).

Carroll and Tosi (1977), recognizing the proactive side of adaptation in their review of several different organizational types, cited several ways in which an organization might influence the nature of its environment in an active, rather than passive, way:

- lobbying to change laws or regulations
- investing time and money into R&D which could increase technological volatility
- increasing the market volatility by generating demands in other segments of the population.

Ackoff (1971) characterized adaptability as both a proactive and reactive process. A system is adaptive, according to Ackoff, if, when there is a change in its environmental and/or internal state which reduces its efficiency in pursuing one or more of its goals which define its function(s), it reacts or responds by changing its own state and/or that of its environment so as to increase its efficiency with respect to that goal or goals. Thus adaptiveness is the ability of a system to modify itself or its environment when either has changed to the system's disadvantage so as to regain at least some of its lost efficiency.

Ackoff defined four types of adaptation:

- Other-other adaptation: A system's reacting or responding to an external change by modifying the environment (e.g., when a person turns on an air conditioner in a room that has become too warm for him to continue to work in).
- Other-self adaptation: A system's reacting or responding to an external change by modifying itself (e.g., when the person moves to another and cooler room).
- Self-other adaptation: A system's reacting or responding to an internal change by modifying the environment (e.g., when a person who has chills due to a cold turns up the heat).
- Self-self adaptation: A system's reacting or responding to an internal change by modifying itself (e.g., when that person takes medication to suppress the chills). Other-self adaptation is most commonly considered because it was this type with which Darwin was concerned in his studies of biological species as systems.

Numerous authors--including Ashby (1960), Marney and Smith (1964), and Berrien (1968), among others--accept the common definition of adaptation generally as follows: "adaptive systems are those which maintain their essential variables within those limits necessary for survival within the environment in which they exist." According to Campbell (1976), in its most general sense, adaptability denotes the ability of an organization to "change its standard operating procedures in response to environmental changes".

Marks (1977) defined adaptability as the organization's ability to achieve a congruence between environmental demands and its own internal organization. This concept of adaptability builds on an earlier proposition that a system copes effectively with only that subsystem of the total environmental variation for which it has developed "matching" internal process structures (Miller, 1973). According to Buckley (1968):

> "When the internal organization of an adaptive system acquires features that permit it to discriminate, act upon, and respond to aspects of the environmental variety and its constraints,

> we might generally say that the system has "mapped" parts of the environmental variety and constraints into its organization as structure and/or "information." Thus, a subset of the environment is coded and transmitted... to result in a change in the structure of the receiving system which is isomorphic in certain respects to the original variety. The system thus becomes selectively matched to its environment..."

Emery and Trist (1965) regarded adaptability as a boundary function. The key to system responsiveness lies in the ability of management to control the boundary conditions--the forms of exchange between the organization and the environment. Through boundary role persons, management should be able to sense changes in the environment, communicate them to relevant subsystems within the organization and regulate the degree of boundary permeability to protect the system from threats, yet open it to opportunity.

Marks (1977) likewise placed ultimate responsibility for adaptation with management--in this case, top management. According to Marks, the critical processes involved in adaptation are planning, strategizing and forecasting. These are, typically, management functions. To be effective, adaptive planning must follow three general guidelines:

1. The planning system must be concerned with the development of strategy, not with "number-crunching" exercises.
2. The development of strategy must be an interactive process involving most levels of management.
3. Planning must be organized in such a way as to be used "comfortably" by top management "in the fulfillment of what is now their major task."

Berrien (1964, 1968, 1971, 1976) discussed organizational adaptation in terms of Group-Needs Satisfactions (GNS)--satisfactions which members of a group experience by virtue of their membership--and Formal Achievements (FA)--the outputs for which the system was designed. Typically, while a work group functions in such a way as to increase its GNS, it is constrained by the supervision or supra-system which serves as a damper or suppressor on GNS. Simultaneously, the supra-system's principal interests are toward increasing FA, while the work group provides a balancing resistance to these FA pressures. In such a system, both outputs are controlled by a balancing of conditions. The upper limit of FA is determined by the physiological capacities of the workers, their norms, and methods of operation. The lower limit of FA is established by the supra-system which demands a minimal level of output on pain of reprimand, or in extreme cases, separation from the supra-system. The lower limit of GNS is in the hands of the work group itself, which will disband when satisfactions reach some unacceptable level. Finally, the upper GNS limit is controlled by the supra-system, which imposes restraints on what it construes as too much socializing or other interpersonal interaction not contributing directly to FA. The balancing of these two competing, yet complementary and mutually contributory, functions is what allows the system to adapt, both externally and internally.

Terreberry (1968) wrote that "system adaptability (e.g., organizational) is a function of the ability to learn and to perform according to changing environmental conditions". Several factors appear critical to this ability:

1. Flexible structure, e.g., decentralized decision-making;
2. Diversity in input and output inter-dependencies;
3. Perceptual and information-processing capacities, characterized by
    - ability to secure advanced information of impending change (through boundary personnel)
    - search for and activation of more advantageous input and output transactions
    - available memory store of interchangeable input and output components in the environment.
4. Internal changes that improve system's transactional advantage (e.g., technology).

The concept of adaptation-adaptability has been shown to relate significantly to the construct of organizational effectiveness. Steers (1975) reviewed a representative sample of seventeen multivariate models of organizational effectiveness and demonstrated that, while there was "a lack of consensus as to what constitutes a useful and valid set of effective measures," the adaptability-flexibility construct was the most frequently used evaluation criteria. Table 3 shows a comparison of the frequency of usage of various effectiveness criteria in the literature.

TABLE 3. EFFECTIVENESS CRITERIA AND FREQUENCY OF USAGE IN SEVENTEEN MULTIVARIATE MODELS

(from Steers, 1975)

Criteria of Effectiveness	Frequency of Usage
Flexibility; ability to adapt	10
Productivity	6
Satisfaction	5
Profit	3
Resource Acquisition	3
Absence of tension or strain	2
Control over environment	2
Development	2
Efficiency	2
Keeping employees	2
Growth	2
Integration	2
Openness of communications	2
Survival	2
Other	1

Bennis (1966) identified three criteria of organizational health: adaptability, reality-testing and identity. Adaptability here refers to an organization's ability to survive in a rapidly changing, turbulent environment. As such, it coincides with the organization's problem-solving ability. Identity, an essential prerequisite for adaptability, denotes the degree to which an organization is clear about and committed to its goals. Reality-testing, the ability to sense changes and pertubations in the environment, is also essential before adaptabilty can occur.

Building upon Bennis' notion of adaptability, Schein (1965, 1970) developed the notion of the Adaptive-Coping Cycle as the primary mechanism for adaptation. Six processes comprise this cycle of activities, as discussed in Chapter 1. Schein's notion of adaptability was developed further in a military context by Olmstead (1972). Olmstead added a seventh process to Schein's cycle--that of feedback, the transmission of information on the results of the coping actions taken. These seven processes became, for Olmstead, the major components of a theoretical construct which he named "Organizational Competence".

> "The conceptual framework derives from the view that one of the most critical factors in the effectiveness of any organization is its ability to sense changes in its external and internal environments, to process the information sensed, and to adapt operations to the sensed changes. The ability of the organization to perform these functions is what is meant by "Organizational Competence"--the capacity of an organization to cope with continuously changing environments" (Olmstead, 1972).

Competence, or adaptability in its most general sense, is not synonymous with the traditional concept of "effectiveness," but rather is a major determinant of it. In a study of 10 groups of 12 officers participating in a battle simulation, Olmstead found that the seven processes of Competence accounted for 46% of the variance within effectiveness. Thus, where "Effectiveness" is the final outcome (mission accomplishment, productivity, etc.), "Competence" is the ability of the organization to perform the critical operational functions, or processes, that lead to the achievement of effectiveness.

Webb (1974), in a study of the voluntary (church) organization, tested a four-factor model of organizational effectiveness comprised of cohesion, efficiency, adaptability and support. Results of the study indicated that adaptability--the congregation's readiness to accept change and its ability to respond effectively to change and regain its original level of operation--accounted for 17% of the variance in the measure of overall church effectiveness. Webb concluded that because the nature of voluntary organizations implies "rotational leadership," it is critical that the membership have a flexible disposition. Webb even suggested sporadically imposing purposeful small-scale change on the organization to "prevent stagnation."

Effectiveness, in terms of adaptation, represents the organization's ability to achieve a balance between opposing forces. Louis (1980) pointed to the natural tension between two input processing systems found in most modern organizations: recruiting, which serves adaptive purposes, and socialization, which serves homeostatic purposes. Ideally, recruiting and socialization should be interdependent. However, in practice, mutual design and intersystem coordination almost never occur. Through recruiting, new members are engaged to fill positions in the ongoing sociocultural system that is the organization. The aim in recruiting is to fill positions. Typically, therefore, there is a tendency for recruiters to "sell" (or oversell) prospective members on the organization and thereby create expectations about life in the organization that, in the extreme, may be grossly inaccurate. Inaccurate and subsequently unfulfilled expectations lead to disillusionment and discontent among new members, and may ultimately result in their decisions to leave the organization. Instead of merely filling positions, recruitment should be aimed at filling positions with appropriately qualified and realistically informed individuals. To do this would require reintegration of overlapping socialization functions. It is in and through socialization that discrepancies between the glorified images of life in the organization engendered during recruitment and the organizational realities are experienced.

Weick (1969) noted a different strain in the organization as it strives for flexibility (i.e., adaptation to changes in the internal environment), on the one hand, and stability on the other.

> "Organizations continue to exist only to the degree that they are able to maintain a balance between flexibility and stability... (However,) the requirements for flexibility and stability are mutually exclusive" (Weick, 1969).

As structure is applied to facilitate stability within the organization, the ability to detect changes in the environment is reduced and system flexibility is jeopardized. Effective coping--maintaining stability and flexibility--can occur, according to Weick, in at least two ways. The first, sequencing, involves the selective structuring of processes depending on the predictability desired at a given time. The second, parallel-processing, involves the simultaneous structuring of processes in two different subsystems. While very little research has been done on the sequencing approach, significant attention has been given to the real-life application of parallel-processing strategies (Miller, 1973). The differentiation-integration principle of Lawrence and Lorsch (1969) is perhaps the most well known adaptation of this strategy:

> "(H)ow much differentiation should exist among various groups...depends upon what internal characteristics each group must develop to carry out planned transactions with the environment. More specifically, it depends primarily upon the extent to which the certainty of information within the various parts of the environment is similar or different" (Lawrence and Lorsch, 1969).

Successful adaptation results in a steady state. Equilibrium, as conceptualized in systems theory, refers to the tendency of a system to return to a given point or state (homeostasis) after being disturbed by external forces. In this context, equilibrium is a dynamic concept. Because survival presupposes a regular exchange of inputs and outputs, the notion of equilibrium must imply a state in which this exchange is occurring. Both internal and external factors regulate the exchange. Internally, the organization must have an adequate work force and workplace and be willing to provide adequate support for the through-put process. To counteract external forces, the organization must be flexible technologically so that it can adjust to modifications in input availability and output demand (Trist, 1969).

Litterer (1973) related the notion of equilibrium to the goal structure of the organization, specifically in terms of profit and loss. The apparent stability of an organization's financial status is, in reality, the net result of a financial loss followed by a vigorous effort to bring in profit, followed by a profit, followed at a later point by another upset resulting in a loss, *ad infinitum*. In this way, Litterer believed, the organization moves from equilibrium point to equilibrium point. Importantly, these equilibrium points are often interrelated in such a way that efforts to bring one set of behaviors into equilibrium may result in disturbing the equilibrium of another set of behaviors. Therefore, while the organization has multiple equilibrium points (and related goals), not all of them are simultaneously obtainable.

The general orientation of the literature on adaptation has been heavily criticized by DeGreene (1980). He noted that most of the work on adaptive systems has been based on assumptions that have led to some persistent pockets of ignorance. Among those assumptions are the following:

- Environmental change is relatively slow and continuous and consequently can be sensed and "understood by the system."

- Environments consist of one or more forces but not of fields of forces, the interactions among which may result in a qualitatively and quantitatively reconfigured field.
- There are no limits to system complexity (although limits to biological size and to surface/volume ratio and the like have long been recognized).
- The same type adaptive processes are applicable over the life history of the system.

DeGreene's major thrust was that there is no such thing as an inherent general system adaptability. There has never been a system and there never will be a system--except perhaps for the universe as a whole--which is generally adaptable. Certain critical and catastrophic periods in the system's life--in particular, stress adaptability--and qualitatively new designs are usually necessary to handle these situations. He suggested that natural evolution and natural adaptability may be far removed from the normative adaptability of today's human systems.

Growth

It is generally accepted that an organization must continue to grow or eventually it will perish (Davis, 1951; Drucker, 1954; Hodge and Johnson, 1970; Jucius and Schlender, 1965). However, there is not a general consensus on the precise meaning of "organizational growth". In an extensive review of the literature, Starbuck (1965) identified four approaches to the subject. The first is the cell-division model, in which the organization is considered analogous to an organism. Growth is seen occurring as it does with any organism--through cell division. This approach gives little attention to the influences of internal and external change processes. The second approach is the metamorphosis model. This model focuses on the different patterns of structure and function that appear as an organization grows. The metamorphosis model is the basis of the approach taken by Lippitt and This (1979) and has been proven useful in comparing organizations. The third model is termed the "will-o'-the-wisp" approach. Here growth is viewed as the process of pursuing some kind of resource or advantage. The final approach is the decision-process model by which the model builder attempts to reproduce the basic characteristics of a single decision process in enough detail to permit actual predictions of future decisions.

Starbuck (1965) found that growth generally was defined as "the change in an organization's size when size is measured by the organization's membership or employment". Several aspects of the growth process are identified in his review:

- Growth is not spontaneous. It is a consequence of decisions: to hire, to fire, to increase output, to stimulate demand, etc.
- Organizational growth can take place only if increased size is positively related to the achievement of the organization's goals and/or the goals of individual members of the organization.
- Organizational growth may be a goal in itself, as a symbol of success or a benchmark for progress, but the most widely accepted approach to growth has been that it is either a means of attaining other goals or a side effect of such attainment, rather than an end in itself.

Child (1979) identified two major theoretical models used to describe organization growth. The two models represent the two sides of a continuing debate over what forces generate or thwart organizational growth. On one side are the adherents to a natural selection, or environmental, model. This approach employs a biological analogy of natural selection to suggest that firms which survive are those which have adapted themselves to the environment. Theorists within this framework posit that environments "select" organizations for survival and growth according to the congruence between their activities and the demands of the environment. Child saw two limitations to this model. First, it does not account for "imperfections in the system" whereby certain organizations seem to find protective niches in the environment. Second, it does not allow for the possibility that the leaders of some organizations are able to dominate external parties by purposive strategies. The fact that this model gives no information on how an organization adapts is an admitted limitation of the approach.

On the other side is the purposive action approach, which focuses on the actions by organizational decision makers aimed at generating new conditions, upon the motivations and political processes which underlie such actions, and upon the conscious strategies for managing or adapting to the environment which actions express. The debate between these two schools provides a theoretical framework within which to analyze organizational growth in terms of the environment and the policies adopted by decision makers.

Child further identified three motives for growth usually attributed to senior managers and decision makers who exert the most influence on policy. They are:

1. Growth is a means for satisfying the aspirations of organizational members. As organizations grow, the member rewards tend to increase. Also, there is greater opportunity for new projects to be undertaken, better career prospects, and increased social prestige.
2. Growth can increase the organization's chances of survival. Available data indicates that fewer large companies fail than smaller ones, and the government is more apt to "rescue" a failing large company. Also, growth tends to increase economic resources, bargaining power, and diversity of markets.
3. Growth may be an aid to other strategies selected to enhance an organization's performance. High product quality and desire for success can lead to organizational growth.

Litterer (1973) noticed a tendency in the literature toward using the notions of "growth" and "size change" interchangeably. This, he believed, leads to considerable confusion. In distinguishing the two concepts, Litterer defined growth as "a process internal to the organization which brings about certain directions of development". Size, on the other hand, is something which results from growth.

> "To suggest, as is sometimes done, that a change from one size to another is growth confuses effect with cause. Such a view may also obscure the fact that growth can be manifest in ways other than changes in size" (Litterer, 1973).

Lippitt and This (1979) concurred with Litterer's conclusions and described organizational growth in terms of renewal, rather than an increase in size. The key element in organizational renewal is the ability to respond appropriately to situations. The renewal model, illustrated in Figure 4, depicts this process.

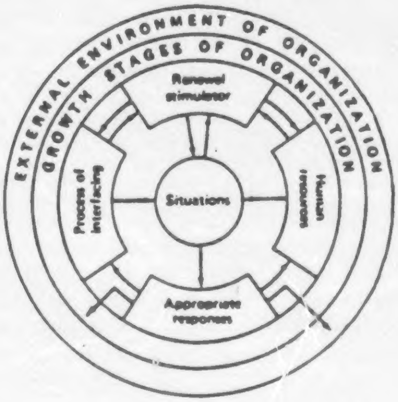


FIGURE 4. ORGANIZATION RENEWAL

(from Lippitt and This, 1979)

Four principal concepts characterize renewal:

1. Human resources - the groups of individuals needed to achieve multiple goals.
2. Interfacing - the process by which individuals meet to solve problems and make purposeful decisions.
3. Organizational growth - the stages of development through which the organization progresses.
4. Environmental response - a situational response to external factors influencing the growth of the organization.

The process of organization renewal requires three phases: (1) confrontation (awareness, self-development and organizational change); (2) search (communication, problem-solving and planning); and (3) coping (confronting problems in a new way). Organizational growth is accomplished through a continual process of renewal--that is, through repeated confrontation-search-coping cycles.

Lippitt and This (1979) identified six developmental stages in the growth process: (1) creation, (2) survival, (3) stabilization, (4) gaining a reputation and pride, (5) achievement of uniqueness and adaptability, and (6) contribution to society. Passage to a succeeding stage is not automatic, nor is it impossible for the organization to "slip back" into an earlier stage. Regression, however, may be adaptive (e.g., a temporary return to survival stage because of unresolved conflict within the company). Most organizations, according to Lippitt and This, are stagnating at the third stage, bogged down excessively in paper work and details, neglecting the need for future planning and adaptation.

Berrien (1976) addressed the concept of growth in terms of adaptation and coping. Growth in a social system is measured in terms of role additions, i.e., an increase in the number of people interacting within the system boundary which requires some adaptation. Such an incremental change in size brings with it (1) modification in role specialization and (2) changes in the interactions among the components. Organizational growth beyond a given point not only requires role specialization but also additions of several persons discharging identical or similar roles. *These individuals begin to form* social subsystems with their own interactions and boundaries and their own GNS/FA ratios. The internal adaptations required for growth essentially reside in these subsystems making provision for the proper balance of maintenance and productivity. When one examines organizations that have fallen into difficulties because they have grown too fast, the problems usually can be found in (1) a breakdown in exchanges among the subsystems that would otherwise sustain their mutual supports and (2) inadequate maintenance inputs or some other condition unbalancing the GNS/FA ratio within a few critical subsystems or throughout the organization.

Scott (1974, 1979) and Peery (1972) have been particularly critical of the systems and organizational theoretic affinity for growth as a normative value. In particular, Scott (1979) has pointed to the traditional belief that open systems have greater survival potential than closed or mechanistic systems. This belief is predicated on the assumption that open systems are better adapted for exploiting survival possibilities in the face of uncertainty and turbulence. By implication, however, this means that one system will adapt and survive at the expense of other systems competing for resources in the same environmental domain. The proper course for the future, he says, is to recognize limits to growth.

Filley and House (1969) define growth in more operational terms as an "increase in absolute increments of change in growth indexes, principally sales, assets and employment--generated from internal sources." In this perspective, growth occurs in three stages:

1. The Small Firm. At this stage, almost all organizational processes are executed by the owner-manager. By the end of this stage, however, differention into operating activities has begun. Relationships among personnel are generally personal with few rules and regulations. Goals are usually defined and set by the owner-manager.

2. Dynamic Growth. To enter this stage, four conditions must exist: innovation, significant returns for risk, entrepreneurial orientation and additional resources. Growth at this stage is typically very rapid as sales rise and new personnel are added. Leadership gradually changes from personal to entrepreneurial and charismatic. Attention during this stage is turned toward exploiting new opportunities; internal resources may be lagging behind.

3. Rational Administration. This stage marks the birth of a "bureaucracy." The organization is structured by a well-defined set of tasks, job responsibilities, and authority levels. Managerial emphasis is on planning and controlling activities to insure long-term survival.

B. RESEARCH

As is obvious from the foregoing theoretical discussion, many of the concepts used to characterize open systems are very abstract. Because of their abstractness and breadth, they are very difficult to operationalize, and hence, to subject to empirical investigation. This is, in fact, one of the major criticisms levied against systems theory as a framework for understanding organizational behavior (Connolly, Conlon and Deutsch, 1980; Price, 1968b; Scott, 1974; Small, 1980; Webb, 1974). Several research studies were uncovered in this review, however, and are discussed below.

System Openness

The hypothesized relationship between boundary permeability, relationship mutuality and "effectiveness" has been supported by data from several studies comparing organic and mechanistic organizations.
Smith (1970) investigated the innovativeness of several hundred technical projects produced in a variety of academic and health agency settings. Settings were grouped according to their marginality, i.e., the amount of

80

contact with external environments being studied. Results indicate that innovativeness of projects produced in more marginal settings (i.e., more permeable boundaries) was significantly higher than those produced in less marginal settings. Moreover, the use of consultants, membership in professional societies and other external contacts all correlated positively with the production of innovative technical papers. A similar correlation was found regarding internal boundary permeability. A number of variables used as indices of internal openness (e.g., extra divisional consultation) were positively related to measures of performance.

Aiken and Hage (1968) studied the initiation of new programs in 16 social welfare and health organizations. Results showed that a significantly greater number of programs were initiated by those agencies which also participated in joint programs (i.e., those agencies with greater external boundary permeability).

Adaptation-Adaptability

Most of the research undertaken on the methods by which organizations adapt to their environments concentrates on sample-wide generalizations on the basis of bivariate relationships established through product-moment correlations (Miller, 1979). Contextual variables, for the most part, have been ignored. Miller noted that this condition holds true even for contingency theories:

> "While the general orientation is called 'contingency theory,' this is something of a misnomer because contingencies are so narrowly and simplistically defined. For example, it may be said that *if* the environment is uncertain, *then* organizations will or must differentiate their sub-units. A condition of *ceteris paribus* is assumed, and, often, only *two variables* are considered without carefully examining the different contexts which may determine the magnitude and direction of their relationship".

This essentially bivariate approach, according to Miller, is at the root of the conflict among adaptability study findings. While some researchers have found two variables to covary positively, a comparable number have demonstrated a negative relationship. In a study of 106 firms through published accounts, Miller showed that the direction/significance of bivariate product-moment correlations may vary significantly, logically, and systematically according to the adaptive approach used by the firm. An examination of relationships within carefully defined contexts, therefore, could help to resolve some of the common discrepancies in the literature. Miller suggested the development of an empirically based organizational typology which could be used to classify organizations according to several attributes and thereby facilitate prediction of other adaptive characteristics. Advances have been made in this direction by researchers such as Paine and Anderson, Thompson and Tuden, Perrow, and Moberg and Koch.

Mott (1972) conducted an extensive review of the empirical literature on the correlates of productivity, adaptability and flexibility and found a preponderance of contradictory findings. He observed also, however, the dissimilarities among research settings in which these studies were conducted, especially in the degree of system closure. Mott then conducted a large-scale study using ten hospitals, three federal agencies and one other organization to test certain hypotheses about productivity, adaptability, and flexibility in the light of measures of system closure. His findings on adaptability and flexibility are summarized below:

Adaptability:

1. Integration at the cultural, organizational and psycho-social levels was required to facilitate communication and problem-solving.
2. Integration of the elite promoted behavioral adaptation.
3. A high proportion of professionals among personnel was negatively related to behavioral adaptation.
4. The role of management is adaptive; management must solve major problems and make major changes in routine because it has the authority and resources to do so.

5. The clarity of objectives was positively related to behavioral adaptation.
6. Older buildings housed less adaptable staffs.

Flexibility:

1. In the hospitals studied, the more flexible were the least well run. Flexibility and coping ability were facilitated by a large cadre of experienced nurses. Conversely, in the federal agencies studied, the flexible divisions were also the most productive ones.
2. Flexibility was not related to the clarity of objectives and rules.
3. When flexibility resulted from careful planning for contingencies, the characteristics of flexible organizations resembled those of adaptive organizations. However, when flexibility involved improvised responses to emergencies, clarity of roles, productivity and adaptability were low.

Campbell, Bownas, Peterson and Dunnette (1974) reviewed the empirical literature on adaptability/flexibility/innovation adoption as part of a major review of organization effectiveness research. Campbell et al.'s overall conclusion is that "many authors have written about this dimension...but relatively few have made attempts to measure it". Four such studies were identified from the 1960-1973 timeframe. A brief description of each is given below.

Mahoney and Weitzel (1969) factor analyzed questionnaire responses from 283 organizations and derived two factors related to adaptability, flexibility and initiation. Flexibility referred to a willingness to try out new ideas and to solve new problems; initiation, to the improvements in work methods and operations. Placing these factors into a multiple regression equation with an overall effectiveness rating as the predicted criterion, they found that initiation--but not flexibility--was one of 7 factors that produced a .74 multiple correlation of effectiveness.

Aiken and Hage (1971) used the factor of innovation to study the organizational processes related to effectiveness. Innovation was defined as the generation, acceptance and implementation of new ideas, processes or products in an organization for the first time. Using response data from 520 staff members in 16 health and welfare organizations, Aiken and Hage found that their measure of innovation was significantly related to: degree of complexity, professionalism, intensity of scheduled and unscheduled communications, and formalization of rules and procedures.

Goodman (1970) indirectly measured adaptability by presenting 46 managers with a list of 8 organizational criteria and asking them to rank the criteria in order of importance for organizational design. The two criteria related to adaptability, "quick reaction capability" and "flexibility of staffing", ranked fifth and sixth, respectively.

The Olmstead (1972) study attempted to correlate adaptability with overall effectiveness in a laboratory simulation of ten groups (n=12 per group) of Army officers. Based on the conceptual model of "Competence" described previously, Olmstead found that adaptability correlated .79 with effectiveness, when comprised of decision-making, communicating implementation, and coping actions.

McClelland et al. (1953) and Fiske and Maddi (1961) found that the rate of change involved in adaptation is crucial to the amount of resistance displayed by the organizational members and, hence, to its success. McClelland has postulated that small displacements from the "adaptive level" trigger positive affect while large displacements trigger negative affect Research conducted by McClelland and Fiske and Maddi suggest that an organization's concept of the optimum rate of change is a function of past experience, and that acceleration of change, not velocity of change, is the central variable which evokes resistance (see also Bonini, 1963).

3. FACTOR III: ORGANIZATIONAL CHANGE TECHNOLOGIES

Factor III encompasses organizational change technologies. The variables loading on this factor focus on those techniques normally associated with the organizational development domain and reflect concerns for individual growth and development in organizations, personnel interface with jobs, the organization and the work process. The principal variables included in this factor are change agent, intervention, organization, training, feedback, process, and job enrichment. A detailed explanation of each variable can be found in Baudhuin et al. (1980).

A. THEORETICAL BACKGROUND

Social technology is well ahead of theory building in the application of behavioral science principles to organizations (Alderfer, 1976). Since the early 1950's, there has been a growing desire among behavioral scientists and managers alike to confront and direct organizational change. However, until very recently, the scales have been tipped in the direction of application of change efforts and away from understanding the change process itself (Blake et al., 1964; Greiner, 1967; Lawrence and Lorsch, 1967).

Systems theory offers the behavioral scientist a viable conceptual framework within which to understand the dynamics of organizational change. Beer and Huse (1972) present a systems model of the organization, shown in Figure 5. Inherent in this model are several notions critical to an understanding of organizational change:

1. An organization is an open system.
2. Organizational outputs may be increased by improving the inputs and/or processes.
3. By means of feedback loops, organizational processes can be adjusted to reflect more accurately the needs of the environment, the system, and the people comprising it.

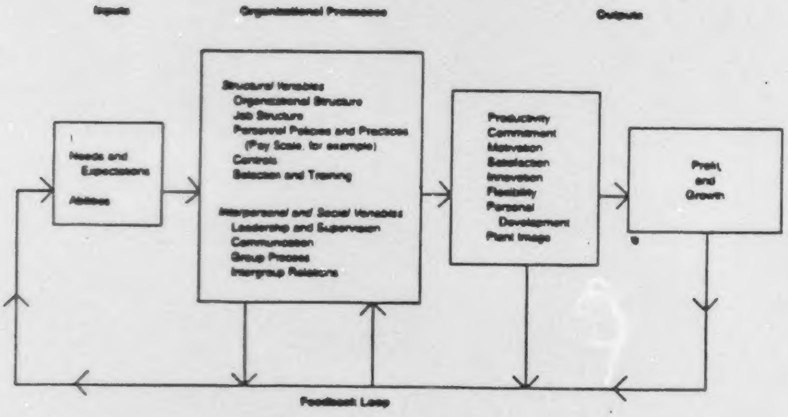


FIGURE 5. SYSTEMS VIEW OF THE ORGANIZATION
(from Beer and Huse, 1972)

Spencer and Cullen (1978), in a similar fashion, represented the change process itself in a systems model.

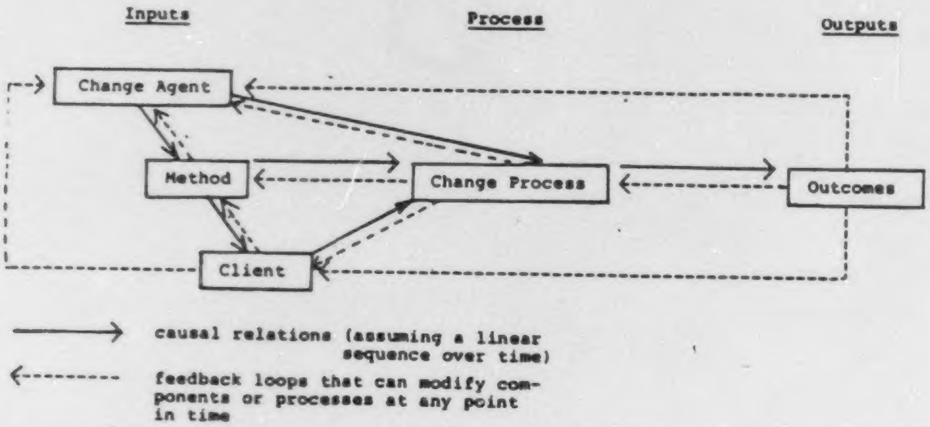

Inputs
Process
Outputs
Change Agent
Method
Change Process
Outcomes
Client
causal relations (assuming a linear sequence over time)
feedback loops that can modify components or processes at any point in time

FIGURE 6. A SYSTEMS MODEL OF ORGANIZATIONAL CHANGE
(from Spencer and Cullen, 1978)

The systems model of organizational change is based on the Lewinian (field theory) notion of change as a process of unfreezing, change, and refreezing. (Beer, 1976; Benne and Birnbaum, 1961). According to this model, the system is in a "quasi-stationary equilibrium," balanced between restraining and driving forces. Driving forces (e.g., pressures to produce, desire for incentives) tend to increase production, while restraining forces (e.g., resistance to training, feelings of meaninglessness) tend to decrease production. Change takes place when the balance of forces is upset. This balance unfreezes the pattern. Planned change uses situational forces to accomplish unfreezing, to influence the movement in generally desirable directions, and to rearrange the situation in such a way as to stabilize the change or improvement. A detailed explanation of this model is given in Schein (1965).

The concept of change occupies a paradoxical place in organizational theory. On the one hand, it is described as an inevitable, ubiquitous, and "permanent" phenomenon. As Porter, Lawler and Hackman (1975) stated:

> "The pace of change will vary from organization to organization, but the fact of change will not."

As the environment changes, so the organization must change and adapt to the new conditions (Terreberry, 1968). The organization is literally bombarded with new information, technological advances, human resource modifications and the like which threaten its equilibrium and force an adaptive response (Katz and Kahn, 1966).

Some theorists, however, caution against the "deifying" of change, and warn that it may foster a covert orientation towards change for change's sake. As Argyris (1968) wrote:

> "The almost compulsive idealization of change may even lead some scholars and interventionists to evaluate organizational development as being effective to the extent that it can be shown to bring about change. For example, Buchanan and Greiner have presented analyses of successful and less successful organizational development programs. Their primary criteria for success were the extent to which output behavior (productivity, morale, communication) was reported to have increased and the extent to which changes in behavior could be found to have spread throughout the system."

Change, while inevitable and adaptive, should not become its own motivation or criterion of success.

Katz and Kahn (1966) also approached change with mixed feelings. While change may be inevitable and pervasive, radical change is not the modus operandi of the organization.

> "Though organizations are always in some degree of flux and rarely, if ever, attain a perfect state of equilibrium, major changes are the exception rather than the rule" (Katz and Kahn, 1966).

Unfortunately, there remains some ambiguity as to what distinguishes a "degree of flux" from a "major change". Major changes, when they do occur, are attributable to two sources: (1) changed inputs from the environment and supersystem, and (2) internal strain and imbalance. The former type of change results from environmental changes (resources and market fluctuations) or the adoption of new norms either by the supersystem or, more slowly, by the organizational members. The latter type of change results from horizontal (across subsystems) or vertical (between hierarchical levels) strain.

It is generally held that externally induced change poses the greatest threat to the system. As Katz and Kahn wrote:

> "The basic hypothesis is that organizations and other social structures are open systems which attain stability through their authority structures, reward mechanisms, and value systems, and which are changed primarily from without by means of some significant change in input. Some organizations, less open than most, may resist new inputs indefinitely and may perish rather than change. We would predict, however, that, in the absence of external changes, organizations are likely to be reformed from within in limited ways. More drastic or revolutionary changes are initialed or made possible by external forces."

Benne and Birnbaum (1961), while recognizing the inevitability of external change and its disruptive effects on the organization, emphasized the notion that organizational change can--and must--be planned:

> "Change in the organizations is unavoidable. Freedom, in the sense of the extension of uncovered and effective human choice, depends on man's power to bring the processes of change, now often chaotic and unconsidered, under more planful control."

Planned change is a purposeful intervention into the organization aimed at directing and controlling its inherent change mechanisms (in people, structure and processes) to effect adaptive and sustaining

7

responses to challenges from its internal and external environment. Bennis (1965) noted that what was lacking in social (organizational) change theory was not a "theory of change", but a "theory of changing" which would address both the dynamics of change and, more importantly, matters of directing and implementing that change. Robert Chin (1961, 1963), a colleague of Bennis, drew up some prerequisites for such a theory.

a. "A theory of changing must include manipulable variables--accessible levers for influencing the direction, tempo, and quality of change and improvement.

b. The variables must not violate the client system's values.

c. The cost of usage cannot be prohibitive.

d. There must be provided a reliable basis of diagnosing the strength and weakness of conditions facing the client system.

e. Phases of intervention must be clear so that the change agent can develop estimates for termination of the relationship.

f. The theory must be communicable to the client system.

g. It must be possible to assess appropriateness of the theory for different client systems" (Bennis, 1965).

Planned Change and Organizational Development

Undoubtedly the most common label used to describe planned change (as conceived in the foregoing discussion) is Organizational Development (OD). It is not entirely clear who coined the phrase organizational development, but it most probably is attributable to Robert Blake, Herbert Shepard, and Jane Mouton (French and Bell, 1978). Building on the insights and knowledge of laboratory education, these researchers attempted to develop a training methodology which would better address the dynamics of the organization as a total system. Organizational development has since been defined in several different ways. Common threads tie all of these definitions together, though each reflects the peculiarities of the particular underlying theory of change.

Bennis (1965) defined organizational development as:

> "A response to change, a complex educational strategy intended to change the beliefs, attitudes, values, and structure of organizations so that they can better adapt to new technologies, markets and challenges, and the dizzying rate of change itself."

Beckhard (1969) expanded Bennis' definition by identifying organizational development as a method of planned change:

> "Organization development is an effort (1) planned, (2) organization wide, and (3) managed from the top, to (4) increase organization effectiveness and health through (5) planned interventions in the organization's "processes", using behavioral-science knowledge."

Beckhard noted, however, that organizational development is not synonymous with planned change. Other methods (e.g., management development and operations research) also can be used to effect change. However, management development focuses on only one level of the organization, while operations research restricts itself to increasing productivity. The status of OD as the most proper and useful method of planned organizational change is due to its system-wide orientation and application. Because an organization is a complex system comprised of many interdependent subsystems and processes, any attempt to change the system must take into account all levels of manpower and all processes and outputs (Luthans, 1977; Bennis, 1969; Katz and Kahn, 1966).

French and Bell (1978) attempted to capture the multidimensional nature of OD when they wrote:

> "In the behavioral science, and perhaps ideal, sense of the term organization development is a long range effort to improve an organization's problem solving and renewal processes, particularly through a more effective and collaborative management of organization culture--with special emphasis on the culture of formal work teams--with the assistance of a change agent, or catalyst, and the use of the theory and technology of applied behavioral science, including action research."

The authors characterize OD as a seven-faceted process. It is:

1. An interactive process--a "process of becoming". It involves both interventions and responses to them. As such, OD is a long-term endeavor.
2. A form of applied behavioral science. Change is effected through the planned application of scientific principles derived from social psychology, social anthropology, sociology and other behavioral science (see also Beckhard, 1969; Merton and Lerner, 1961; Turney and Cohen, 1978; Umstot, 1980).
3. A normative re-educative strategy. OD involves an improving and managing of organizational culture--its norms, values and attitudes. Change occurs to the extent that normative orientations to old patterns are abandoned and new commitments are developed (see also Beer, 1976; Bennis, 1969; Blake et.al., 1964; Chin and Benne, 1969).
4. Systems-oriented. Several assumptions are made: (1) events occur in relation to one another; (2) events have multiple causes; (3) causes of events are best analyzed existentially; (4) a change in one part of the system will influence other parts; and (5) to change a system, one must change the system, not its component parts. Blake and Mouton (1969) emphasize this aspect of OD as follows:

> "Organization development means development of the organization. Because of the history of education, training and development in industry, the inclination on seeing the work organization before development is to think and substitute for it the work individual. If the reader does this, he will miss the deepest implication of what is presented. The reason is that he will fail to comprehend how deeply the culture of a corporation controls the behavior of all of its individuals. While the ultimate objective of organization development is to liberate all of the individuals within it, so that they will be free, participative, and contributive to problem

> solving, in order to achieve corporate purposes of profitability, this objective cannot be reached until the constraints that operate within the corporation's culture have been studied and deliberately rejected. The key difference between individual and organization development will be found in this proposition " (French and Bell, 1978).

5. Data-based. Change is effected through the assimilation and evaluation of valid information about the system (see also Argyris, 1968, 1970, 1971).
6. Experience-based. Change occurs through feedback and evaluation of experience-based learning.
7. Oriented towards goal-setting. The objective of change is an increased ability to set realistic, explicit goals and to mobilize resources toward their attainment.

A problem that appears to plague organizational theorists is the apparent lack of conceptual thinking in OD (Kahn, 1974; Schein and Greiner, 1977). Kahn, after reviewing several attempts at defining the field (Argyris, 1970; Bennis, 1969; Beckhard, 1969; Lawrence and Lorsch, 1969; Margulies and Raia, 1972) concluded that these definitions are far too broad to be meaningful.

> "Organizational development is not a concept, at least not in the scientific sense of the word: it is not precisely defined; it is not reducible to specific, uniform, observable behaviors; it does not have a prescribed and verifiable place in a network of logically related concepts, a theory...This assertion is in itself neither praise nor damnation; it merely reminds us that the term is a convenient label for a variety of activities" (Margulies and Raia, 1972).

Such definitions are so eclectic in nature that they lack precision and theoretical connectedness. Compounding the problem is OD's excessive incorporation of colloquial and commercial terms as pseudo-concepts. Kahn enumerates several examples of this, including (1) sensitivity training, which stands for a number of activities which vary considerably; and (2) Grid OD, which is, in fact, a registered trade name--"the antithesis of scientific conceptualization".

The use of these terms as independent variables and the apparent lack of a conceptual framework guiding OD make Kahn suspect the real value of organizational development. The solution proposed by him is a regrounding of planned change in the open systems framework. In this perspective, the structure-process dichotomy is reconciled in the concept of roles, and the focus of OD becomes much more specific, and hence, definable. Change is directed at the recurring behavior patterns constituting organizational behavior; these behavior patterns, or roles, are both structural and processual in nature. Such an orientation in OD will, according to Kahn, "strengthen the practice of organizational development;..and bring the language of organizational development into the larger realm of organizational theory and research."

Schein and Greiner (1977) concurred with Kahn's assessment of OD as lacking a conceptual framework, but disagreed that open systems theory holds the solution. OD, in the context of traditional and open systems theory, is unable to deal adequately with bureaucratic organizations (e.g., Bennis, 1969). Schein and Greiner found this a particularly incapacitating problem because, contrary to the ideals of open systems theory, bureaucracies are (1) the dominant organizational form, (2) quite appropriate for stable environments and routine technologies (Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Woodward, 1965), and (3) probably here to stay--at least for the forseeable future. The challenge to OD, therefore, is to adopt a conceptual framework which makes it relevant and productive in a bureaucratic organization. This means a departure from the traditional view of OD as a means of making an organization more organic and less mechanistic (e.g., Bennis, 1969; Katz & Kahn, 1966) and an adoption of a conceptual framework which recognizes and accepts the bureaucratic structure. Structural contingency theory is the framework proposed by Schein and Greiner.

Umstot (1980), following the suggestion of Schein and Greiner, applied the contingency view of OD to a military organization. In a review of OD efforts in the US military, Umstot addressed two theoretical questions: (1) Is OD linked to values? and (2) Do bureaucracies require different OD technologies? The first question arose out of the writings of French and Bell (1978) and Friedlander and Brown (1974), who assumed that, in order to succeed, OD must enjoy a congruence between practice, theory and values. The values traditionally associated with successful OD are shared power, decentralization of decision making, openness and trust. As Umstot wrote:

> "These values seem counter to those of mechanistic, bureaucratic structures."

The conclusion reached after a review of OD efforts in the military is more of a counter-question than an answer to the apparent uncongruence between OD and military values. Umstot challenged:

> "If value congruence is necessary, then why does OD seem to enjoy popularity among widely divergent types of military units?"

Two plausible explanations were offered: (1) More empirical evidence may show OD to be successful only with managers who hold values congruent to those of OD (as stated above). (2) The consulting process is the key to OD--not values (Argyris, 1970). Umstot tentatively concluded that OD in the military owes its success to its concentration on developing valid information, allowing participants free choice, and developing a commitment to the program.

The second question raised by Umstot challenged the structural contingency approach to OD. He asked why organic technologies (albeit encounter groups) are successful in the military--the epitome of an authoritarian, mechanistic structure. His response was that OD is not contingent on structural variables, but rather on variables such as leadership style of the client, felt needs within the client system and the skills of the client. Therefore, structural contingency theory, based on the organic vs. mechanistic dichotomy, is inadequate for explaining change in the military organization.

Dunn and Swierczek (1977) addressed the conceptual inadequacies of planned change in a different perspective. Their goal was to establish a grounded theory of planned organizational change in the tradition of Glaser and Straus (1967). Grounded theory can be described best as distinguishable from logico-deductive theory, as follows:

> "Whereas grounded theory is generated directly from experience acquired in the course of social research, logico-deductive theory is merely thought up on the basis of _a priori_ assumptions and a touch of common sense, peppered with a few old theoretical speculations made by the erudite" (Glaser and Straus, 1967).

In the course of reviewing the theoretical bases traditionally used in studying planned organizational change, Dunn and Swierczek identified three broad perspectives on theory construction and application.

1. _Universalistic_. Writers in this category tend toward general theories of change. Priority is given to abstraction, formalization and generalization of relations characterizing change efforts. Typifying this perspective is Bennis (1969) and Katz and Kahn (1966).
2. _Situational_. Writers within this perspective emphasize data generation for adapting change strategies to a particular organizational situation. Included under this category are Beckhard (1969), Davis and Cherns (1975), Lawrence and Lorsch (1969), McKelvey and Kilman (1975) and Nelson and Smith (1974). More recent authors could be added to this list, including Cohen and Turney (1978), Schein and Greiner (1977) and Umstot (1980).
3. _Integrative_. This perspective approaches the concept of grounded theory. Its goal is to match the state of knowledge with concrete experiences. Writers within this category include Bowers (1973), Buchanan (1971), Clark (1972, 1975), Franklin (1976) and Greiner (1967).

The general conclusion reached by Dunn and Swierczek was that theories of planned change are, generally speaking, _a priori_ conceptualizations "with little attention to the empirical grounds of theoretically derived expectations about planned change."

Change Agent

The term change agent was first used by the National Training Laboratories in 1947 to denote the "outsider" invited by a system to help with planned change to improve the system's functioning (Lippitt, Watson and Westley, 1958). While most theorists writing about change agents generally seem to agree with this characterization, there has been a growing awareness that the change agent does not necessarily have to come from outside the organization. Bennis, Benne and Chin (1969) and Beckhard (1969) led the movement toward a more open definition of a change agent. These authors included in that role any person--inside or outside the organization--who provides technical, management, or consulting assistance in a change effort. Similar characterizations are found in Burke (1970), French and Bell (1978) and Hornstein et. al. (1971). French and Bell emphasized, however, that one of the key characteristics of the change agent must be objectivity. Therefore, while it is not incumbent upon the change agent to be external to the organization, he must be external to the particular subsystem that is initiating the change.

Argyris (1973) described the role and characteristics of the change agent in terms of choice. The primary task of the change agent is not to design intervention strategies or implement change, for these functions imply an imposing relationship of change agent to organization, a relationship which, according to Argyris, can reduce free choice and internal commitment. Rather, the primary tasks for the change agent "are to generate valid information to help the client system make informed and responsible choices, and to develop internal commitment to these choices. One choice that the client system may make is to change aspects of their system. If the choice is made responsibly, the interventionist may help the client to change. However, the point is that change is not *a priori* considered good and no change considered bad". This places a serious responsibility on the change agent to maintain his autonomy and foster the autonomy of the client system while nurturing a relationship of trust and honesty.

Based on their review of the change literature prior to 1978, Spencer and Cullen (1978) concluded that there has been comparatively little attention paid to the characteristics, qualifications, and role of the change agent. This trend appears not to have changed in the last two years. The work that has been devoted, at least in part, to describing the change agent can be divided into two focal areas: competencies and roles. The following table summarizes the competencies expressed in the OD literature relative to the change agent's success in effecting organizational change. Details on each of these attributes/skills can be found in Spencer and Cullen (1978).

TABLE 4. SUMMARY OF CHANGE AGENT COMPETENCIES
(from Spencer and Cullen, 1978)

1. Ability to create an environment of psychological safety
    - accurate empathy (Truax & Carkhuff, 1966) or "timing" (McClelland, 1975)
    - nonpossessive warmth (Truax & Carkhuff, 1966) or caring (Lieberman, Yalom & Miles, 1973)
        - ability to make friends and contacts (McClelland, 1975; Bennis, 1965)
        - an "integrator" motive profile (affiliation motivation higher than achievement or power motivation--McClelland, 1975; Lawrence & Lorsch, 1973; Kolb & Boyatzis, 1974)
        - positive expectations of others (McClelland, 1975; Argyris, 1970; King, 1973, 1974; Rosenthal, 1976)
    - genuineness (Truax & Carkhuff, 1966), consistency (Argyris, 1970) or congruence (Bolman, 1971)
    - nondirectiveness (Kolb & Boyatzis, 1970; McClelland & Winter, 1969)
    - neutrality (Kochan & Dyer, 1976; Sebring & Duffee, 1977) or emotional self control (McClelland, 1975)
2. Diagnostic Skills
    - observation (Levinson, 1972)
    - critical thinking (McClelland, 1975; Winter, 1977)
3. Initiatory Skills
    - emotional stimulation (Lieberman, Yalom & Miles, 1973), pressure or crisis atmosphere (Hanson, 1970; Greiner, 1967; Carter, 1976)
    - marketing (McClelland, 1975; Dyer et al., 1970)
    - initiation (Carkhuff & Berenson, 1976)
    - goal setting (Kolb & Boyatzis, 1974; Carroll & Tosi, 1973; McClelland & Winter, 1969)
    - feedback (Kolb & Boyatzis, 1974; McClelland & Winter, 1969)
    - "psychological success" (Golembiewski et al., 1972; Brown, 1972)
4. Management Skills (McClelland, 1975) or "executive function" (Lieberman, Yalom & Miles, 1973)

Change agent roles appear to be the most commonly used method of distinguishing the various characteristics, functions, and values of change agents. Spencer and Cullen (1978) identified five categories of change agent roles in the literature, including (1) the advocate or confronter, (2) the expert, (3) the trainer or educator, (4) the collaborator in problem-solving, and (5) the processor. Table 5 presents their findings.

TABLE 5. CHANGE AGENT ROLES
(from Spencer and Cullen, 1978)

	P. A. Clark (1975)	Lippitt & Lippitt (1975)	Havelock & Havelock (1973)	Sashkin et al. (1973)	Tichy (1977)	Munger, Spencer, & Thomson (1976)	Blake & Mouton (1976)
1. Advocate/Confrontor	(Unilateral expert)	Advocate	Catalyst			"Social Advocates"	Confrontative
2. Expert	Unilateral expert	Technical specialist	Solution giver		Analysis at the top	(Expert)	Prescriptive
• Resource linker			Resource linker				
• Researcher	Subordinate technician	Factfinder		Research			
3. Trainer	Delegated	Trainer/ Educator		Trainer	(People change technology)		Theory and principles
4. Collaborator in problem solving (task or people)	Collaborative (delegated)	Collaborator in problem solving Alternative identifier		Consultant	Organization development	Expert Resource "Client centered"	Catalytic
5. Processor (people)	(Collaborative)	Process specialist Reflector	Process helper		People change technology	Process (Resource)	Acceptant

The change agent roles identified in the Spencer and Cullen review fit into one taxa of change agents described in the more global taxonomy of Ottaway and Cooper (1978). The Ottaway-Cooper taxonomy not only provides a typology of change agent types, but also places their roles and functions in a hierarchical ordering. Information on the kind of change agent required at each specific stage in the change process is provided. In outline form, the Ottaway-Cooper taxonomy is as follows:

I. Change Generators

   Task: To convert the issues of society into felt needs for change

   A. Prototypic CG (select the issue, lead the conversion)

   B. Demonstrative CG (publicly display convictions)

II. International Change Implementors

   Task: To implement change intentionally after an organization has recognized a felt need to change

   A. External lCl (invited from outside organization)

   B. Internal lCl (organization members in position to implement change)

   C. External/Internal lCl (organization members who implement change in another part of the organization)

III. Unintentional Change Implementors

   Task: To put the change into practice and normalize it; their primary commitment, however, is to another role

   A. Organization Maintenance Personnel (low commitment to change, high commitment to organization)

   B. Organization Product (Service) Users (least commitment to change, use of products to normalize change)

While this taxonomy does not change the basic typology forwarded by Spencer and Cullen, it does put the change process, and likewise the change agent, into a broader perspective.

The Planned Change Intervention Process

Introduction

Spencer and Cullen (1978) identified five phases characterizing the change intervention process, as follows:

1. an entry or initial contact phase, in which the consultant and client meet and agree on (contract for) the objectives and tasks to be undertaken in the intervention;
2. a research or diagnostic phase, in which data is collected and analyzed to provide some idea of the client's problems or needs;
3. a problem-solving phase, in which the client seeks and evaluates potential solutions to identify problems, then plans (and may set goals) for implementation of solutions;
4. an action phase, in which the client implements the planned solutions (e.g., conducts training or changes organizational structure); and
5. a follow-up or evaluation phase, in which the consultant and client determine the effects of the intervention as compared with the initial objectives, and the consultant either terminates contact with the client or continues in a supportive role.

For the purposes of this review, these five phases will be consolidated further, to include (1) diagnosis, (2) action and (3) evaluation.

TABLE 6. PHASE CONCEPTIONS OF THE ORGANIZATIONAL INTERVENTION PROCESS

(from Spencer and Cullen, 1978)

"Action Research" Lewin (1951)	"Problem Solving/Linkage Process" Havelock (1969)	"Research-Development-Dissemination" Havelock (1969) Clark & Guba (1965)	Social Interaction "Diffusion of Innovations" Rogers (1962)
• Research - data gathering - analysis - diagnosis • Action - unfreezing - changing - refreezing • Research - evaluation	• Identify client "felt needs" • Problem diagnosis • Search for alternatives • Evaluation of alternatives • Solution • Application	• Basic research • Applied Research - product - consumer needs • Development and testing of prototypes • Mass production and packaging • Planned mass dissemination activities ("marketing")	• Identify (a) "gate keepers" and "opinion leaders" (b) contact networks • Awareness • Interest • Trial • Adoption • Maintenance (Reinforcement)

TABLE 6. CONTINUED

"Action Planning" Lippit, Watson, Wesley (1958)	"Intervention Theory and Method" Argyris (1970)	"Consulting Process" Lippit & Lippit (1975)	"Survey-guided Development" Franklin (1976)
• Establish need for change • Establish client-consultant relationship • Data collection and diagnosis • Action planning • Action implementation • Generalization and stabilization of change • Termination	• Generate problem relevant data • Use data to identify solution alternatives and make decisions • communicate shared commitment to these decisions	• Phase I: contact, entry, relationship • Phase II: contract formulation • Phase III: planning for problem solving • Phase IV: Action taking and continuity	• Initial contact • Entry and commitment • Data gathering • Problem Solving/Action Planning - survey concepts training - survey feedback • Exit/termination procedure

Navy HRM Cycle	Army Organizational Survey Feedback Manual	"Training for Development" Lynton & Pareek (1973)	"OD Consulting Approach" "Kolb & Frohman (1970)
• Phase I: Entry - initial contact with clients - "scouting" data collection - planning by consultant team - CO brief • Phase II: - survey concepts training • Phase III: - survey data collection • Phase IV: - diagnosis - survey feedback • Phase V: - action planning • Phase VI: - CMD implementation	• Administer survey • Survey Feedback • Diagnosis • Planning • Action	• Preintervention - expectations: felt needs - motivation of participants • Intervention - training - experience - feedback - reinforcement - internalization • Post-intervention - organization support - evaluation	Scouting Entry - psychological contract Diagnosis Planning Action Evaluation Termination

Diagnostic Phase

A prerequisite for a successful change effort is an understanding of what it is that requires changing. Beckhard (1969) emphasized the primacy of the diagnostic stage in organizational change. He stated that any systematic and planned effort to improve an organization by means of change requires a diagnosis of the social-psychological state of the organization. This process must be conducted on the various subsystems as well as on the behavioral processes. The two principal diagnostic activities are data gathering and goal setting.

- Data-Gathering

French and Bell (1978) defined the diagnostic stage as a family of "fact-finding activities designed to ascertain the state of the system, the status of a problem, 'the way things are'." In so doing, a new level of awareness is created within the system (Dalton, 1970; Greiner, 1967; Lawrence and Lorsch, 1967).

Bartee and Cheyunski (1977) approached organizational diagnosis through a process oriented methodology designed to tap the ideas, perceptions, and suggestions of a representative population within the organization. Their model is based on two key assumptions. (1) self-diagnosis increases cognitive dissonance within the individual and thereby minimizes dissonance with the interventionist; and (2) self-diagnosis facilitates the development of change mechanisms internal to the organization by allowing greater ownership to the program. The latter assumption reiterates Argyris's (1973) emphasis on the information generating nature of the intervention. Argyris wrote that the effectiveness of an intervention depends on its ability to equip the organization members with the skills to diagnose and correct behaviors (based on valid information) and thereby "own" the choices they make regarding their organization. This criticality of commitment, or ownership, of the organization members to a successful change program is emphasized throughout the literature (Blake et.al., 1964, Friedlander and Brown, 1974; McGregor, 1970; Miles et.al., 1969; Neff, 1965).

The methodology proposed by Bartee and Cheyunski is known as the constituency approach. It is based on the assumption that organizational dynamics consist of dynamic interactions (e.g., power relationships, role differentiation, decision making responsibilities) between four primary constituencies which represent significantly different, but equally valid, perceptions of the organization and its problems. These four constituency groups include (1) resource-providers, (2) technology-developers, (3) direct service-providers, and (4) service-acquirers. Through a series of "brainstorming sessions" (a so-called Problem Diagnosis Workshop), the group, representing each constituency , along with the interventionist defines a prioritized agenda of problem areas to be confronted in the change program. Bartee's (1973) emphasis was on the maximization of member participation, collaboration and commitment in the change process.

The issue of subject participation in data gathering and diagnosis is a controversial one. While the aforementioned authors stress the importance of member (subject) involvement in and awareness of the diagnostic process, others emphasize primarily the social scientist's (i.e., interventionist's) awareness of organizational problems and diagnostic data and appear be wary of the subject's involvement in this phase of OD (Beer, 1976). Dunnette and Campbell (1968), in their criticism of laboratory education, appear to follow in this tradition. They stressed the importance of naive subjects (control population) in scientific research, and pointedly accuse laboratory education of being delinquent in this area. Argyris (1968), in response, not only defended laboratory education, but regarded its lack of naive subjects as one of its assets as a change intervention. Uninformed subjects who do not participate "knowledgeably" in the diagnostic processes will tend to resent the change effort, the researcher, and all that it is designed to accomplish. According to Argyris, the researcher excludes the subjects from real involvement in the diagnostic process because of his own mistrust. Aware that the subject can, unknowingly, distort data, the researcher attempts to keep him uninformed, and hence, naive. To Argyris, this is impossible. The subjects are always involved--and aware. "The real question is to create research settings where the individual does not feel the need to distort his behavior and hence produce invalid data".

McGregor (1970) emphasized that individual involvement and awareness in organizational change fosters a sense of commitment to the change program and to the change itself. Involvement in the change process is characteristic of Theory Y management, which, according to McGregor, promotes adaptation to change, cooperation, a general non-defensive attitude toward management and researchers and a commitment to the organizational change prescribed in the diagnosis.

This debate is a continuing dilemma for OD practitioners (Lawrence and Lorsch, 1969). On one hand are the "strict" scientists who advocate consultant-centered diagnosis (e.g., Dunnette and Campbell, 1968). Paramount in this perspective is the scientific rigor of research methods, the validity of "uncontaminated" data and the naivete of subjects studied in the diagnosis. On the other hand are the proponents of client-centered diagnosis, who believe that subject participation in the design and collection of data is likely to increase the relevance of the feedback and the commitment to change (Argyris, 1968; Mann, 1961; Miles et al., 1969, Neff, 1965; Friedlander and Brown, 1974). The change agent is faced, therefore, with a trade-off between "quality of diagnosis and commitment through involvement" (Beer, 1976, 1976). Beer seems to believe that such a decision can justifiably be made on the basis of the problem to be addressed and the environment in which the change must take place. Though the following does not represent a clear-cut basis for such a decision, it does identify the types of trade-offs which will have to be made.

> "The more sophisticated consultant or questionnaire centered diagnosis should be the choice in situations where the problems are not urgent; the client feels a clear hurt; the problems are not obvious; there is little previous experience in the organization with OD and less process awareness; there is low trust within the organization and low probability of open self-diagnosis; and/or the change agent is trusted and perceived as competent. Participative and organic approaches to diagnosis should be the choice where problems are critical; the client does not feel a clear hurt; problems are not difficult to see; the individuals in the organization are aware of organizational process; there is a fair amount of trust between organizational members; and/or the change agent has not had a chance to build expert influence or trust. Few situations will point to a clear-cut and obvious choice between the organic, client-centered diagnosis, and the more rigorous, consultant-centered diagnosis. The considerations just listed will have to be weighed and traded off " (Beer, 1976).

Lorsch and Lawrence (1972) noted that certain "common practices" often jeopardize the usefulness of the diagnostic process: (1) diagnostic attempts tend to be somewhat cursory, (2) they are often carried out post facto, and (3) the change agent is often more concerned with creating a receptive environment than gathering data. These problems seem especially relevant to some of the interventions conducted by Blake et al. (1964) and Seashore and Bowers (1963).

- Goal Setting

The second function of the diagnostic phase is goal-setting. In reviewing the literature on goal setting in change interventions, it becomes apparent that the orientation has been towards vague, systems-oriented goals rather than clear cut, behavioral goals. Dossett et al. (1979) noted that a major difficulty in organizational development is the emphasis on multiple goals that are broad in nature, ambiguously stated, and possibly not shared by all persons responsible. While theoretically tenable, this situation is of major concern to the researcher evaluating a particular change effort. Vague goals (e.g., increased productivity, improved morale, or better interpersonal relations) lead to vague conclusions. Nicholas recommended the specification, at the outset of the program, of "clear-cut, specific objectives that are tied to concrete behaviors". MBO is probably the most notable exception to this problem.

There is a significant body of literature dealing with the overall objectives of planned change. Porter, Lawler and Hackman (1975) reviewed the literature extensively and identified three major goal categories, as follows:

1. Goals for Individuals in their Organizational Roles
    - Interpersonal Competence (Argyris, 1964, 1965, 1970)
    - Self-Control and Self-Direction (McGregor, 1967, 1970)
    - Individual Growth (Bennis, 1966)
    - Receptivity to Change
2. Goals for the Maintenance of the Organization
    - Development of High Level of Trust Throughout Organization
    - Open Communication
    - Confrontation of Conflict (Blake and Mouton, 1969)

- Maximization of Collaboration and Teamwork
- Capacity for Organizational Revitalization (Bennis, 1969)
- Adaptation to Environmental Changes (Bennis, 1969, Lippitt and This, 1979)

3. Goals for the Performance of the Organization
   - Clarification of Organizational Objectives (Steers, 1977)
   - Commitment to Organizational Objectives (Argyris, 1970; Likert, 1967)
   - Creation of Problem-Solving Climate (Argyris, 1965)
   - Increased Innovation (Katz and Kahn, 1966)
   - Effective Utilization of Total Organization Resources (Filley and House, 1969).

Authors cited in parentheses represent landmark works relating to a particular goal.

As Dossett noted, the general orientation toward organizational development goals is multidimensional. Within the schema proposed by Porter et al., there is usually a combining of goals within and between major categories. Beckhard (1969) identified five major goals of every planned change effort: maximized collaboration between units, confrontation and management of conflict; knowledge-based decision making; effective feedback loops, and increased problem solving abilities. Luthans (1977) and French and Bell (1978) also proposed multidimensional goals for OD and noted this trend in the literature to date.

If one "umbrella" concept was identified to encompass the myriad of goals associated with organizational development, it would probably be "effectiveness." As generally conceptualized in the literature, effectiveness refers to an organization's ability to adapt to its environment, to realize its goals, and to attain "its ultimate goal--survival" (Beer, 1976). Each of the objectives of OD listed above contributes to an organization's potential for effectiveness. In this context, Campbell et al. (1974) noted that, while the construct of organizational effectiveness is itself a subject of much debate, the "criteria of effectiveness" is most frequently cited--explicitly or implicitly--as the goal of planned organizational change.

Another issue which emerges during the diagnostic stage is resistance to change. Inextricably tied to this notion in the literature is that of participation, as discussed above. Greiner (1967) reviewed eighteen studies of successful organizational change programs and found that the common element in each was the notion of a shared, vis. unilateral, approach to the change effort. The critical effect of the client's involvement, according to Greiner, was a minimization of any resentment and/or threat caused by an externally imposed change.

Resistance to change is a reaction to a perceived threat or barrier. If allowed to develop, it can hinder any attempts at organizational change (Bennis, 1969; Luthans, 1977; Lawrence, 1970; Williams, 1969). In terms of the individual, Williams (1969) identified four principal reasons for resisting change: (1) insecurity, (2) fear of economic loss, (3) misperceptions of change, and (4) opposing cultural values. In response, Watson (1969) enumerates twelve conditions within the control of the change agent and client system which appear to reduce the resistance:

1. Sense of commitment/ownership of the administrators to the change effort
2. Support of the top administration
3. Participants' perceptions of the change as easing their burdens
4. Agreement between the change and the participant's values
5. Interest on the part of the participants
6. Perception of the change as non-threatening
7. Participant collaboration in the diagnostic efforts
8. Change project adoption by group decision making
9. Proponent empathy with opponents of change effort
10. Use of feedback
11. Mutual support, trust, and confidence among participants
12. Openness to revision/reconsideration during the change project.

Huse and Bowditch (1973) discussed change (and resistance to it) in terms of its effect on the balance, or equilibrium, of the system. The organization's attempt to seek an equilibrium is marked by two opposing sets of vectors. Resisting change and seeking preservation of the status quo are the reactive forces; opposing them, the proactive forces, which work toward change and the attainment of a more optimum balance within the system.

While many theorists believe that the strongest resistance to change comes from management (Cahn, 1978). Argyris (1971) argued that the individuals within the organization also contribute to these reactive forces. He postulated that most individuals are "systematically blind" to their behaviors and are therefore "culturally programmed" to behave in ways that reduce the probability of change. While one might attempt to facilitate change by increasing the proactive forces, Argyris believed that it would be far more productive instead to decrease the strength of the reactive forces. Two approaches have been suggested for reducing the resistance to change in this light:

1) Shift emphasis from "cost control" strategies (e.g. budgets, rules) to "value-adding" strategies (e.g., job enrichment) (Gellerman, 1969).
2) Shift emphasis from "structure-maintaining" to "structure-elaborating" features of the system (Buckley, 1968).

Action Phase

Three key issues characterize the literature on the action phase of planned organizational change: (1) focus of change, (2) targets of change, and (3) type of intervention.

- Focus of Change

There has been a tradition in organizational theory toward dichotomizing planned change interventions into techno-structural approaches, on one hand, and human-processual approaches on the other (Friedlander and Brown, 1974). According to Friedlander and Brown:

> "Techno-structural approaches to OD refer to theories of and interventions into the technology (e.g., task methods and processes) and the structure (e.g., the relationships, roles, arrangements) of the organization. Techno-structural approaches are rooted in the fields of engineering, sociology, psychology, economics, and open systems theory."

The foci of techno-structural change interventions are the structure and content of work and the relationships among workers. Included under this category are job design, enlargement and enrichment and sociotechnical systems interventions.

Human-processual approaches to OD, on the other hand, focus on the human participants and the organization processes (e.g., communication, problem solving, decision making) through which they accomplish their own and the organization's goals. This orientation to OD is rooted in the academic fields of psychology, social psychology and anthropology and in the applied disciplines of group dynamics and the human relations movement. Intervention strategies rooted in this perspective include process consultation, survey feedback, group development and intergroup development. Of primary importance here is the improvement of human functioning and processes based on the value of human fulfillment.

Moravec (1978) categorized OD interventions in a somewhat different manner. He classified interventions as either task-oriented or people-oriented. Task-oriented interventions focus on action/task identification, planning, decision making and productivity. People-oriented interventions focus on increasing the value of human resources by increasing people's self-esteem, technical skills, and managerial skills. A transitional category, incorporating elements of each approach, is what Moravec termed the "social engineering" approach. It includes team building and normative approaches on the one hand, and managerial style programs on the other.

Some systems theorists (Katz and Kahn, 1966; Kahn, 1974) stand in opposition to the dichotomizing of organizational process and structure. As open systems, the organization consists of patterns of interdependent events and activities. What has been termed the organization's techno-structural components can be redefined in terms of roles as "role prescriptions," and the human processual aspects as "role elaborations." According to Kahn, "one central point remains: the structure of an organization is the pattern of actual recurring behaviors." Change, therefore, should be conceptualized in terms of roles. Both the "process-oriented" and "structure oriented" OD practitioners deal with the formal roles (e.g., new technology, new division of labor, new policies) and informal roles (e.g., expectations, satisfaction), whether explicitly or implicitly. Katz and Kahn described this blurring of the structure-process dichotomy in the following way:

> "But in the means of change, as in the target, we see some blurring of the usual dichotomy between structure and process. Even Frederick W. Taylor (1923), that classic exemplar of the structural approach to organizational change, began with process-like persuasion and interaction, first at the top of the company and then with the immortal Schmidt. Morse and Reimer (1956) used counseling, role playing, T-Groups, and other process-emphasizing activities to bring about and anchor the systemic organizational change they sought.
>
> On the other hand, the most process-oriented OD practitioner necessarily enters the organizational structure in which he hopes to encourage change. He creates a role for himself in that structure, and probably changes the role expectations and prescriptions of the people with whom he meets--if only because they are expected to speak with him, attend the group sessions he arranges, and the like. Moreover, his processual interventions, to the extent they are successful, are likely to lead to changes in formal policies, role prescriptions, and other representations of organizational structure."

The systems framework necessitates a multidimensional approach to organizational change. Because interaction/interdependence and equilibrium/homeostasis are the modi operandi of subsystems within the total system, a systems approach requires that mutually consistent changes in all subsystems be made in the process of organizational change. Several implications obtain from this model: (1) Changes must occur in the interpersonal and structural systems which reinforce and legitimize each other (roles having been identified as the interface of these two systems). (2) Multiple interventions and strategies are required within a single program to address the full range of required changes. (3) Persons at all levels of the organization must be involved in the change effort (Beer and Huse, 1972).

To the extent that all subsystems, and hence all subsystemic changes, are interdependent, the loop (see Figure 7 below) can be entered at any place.

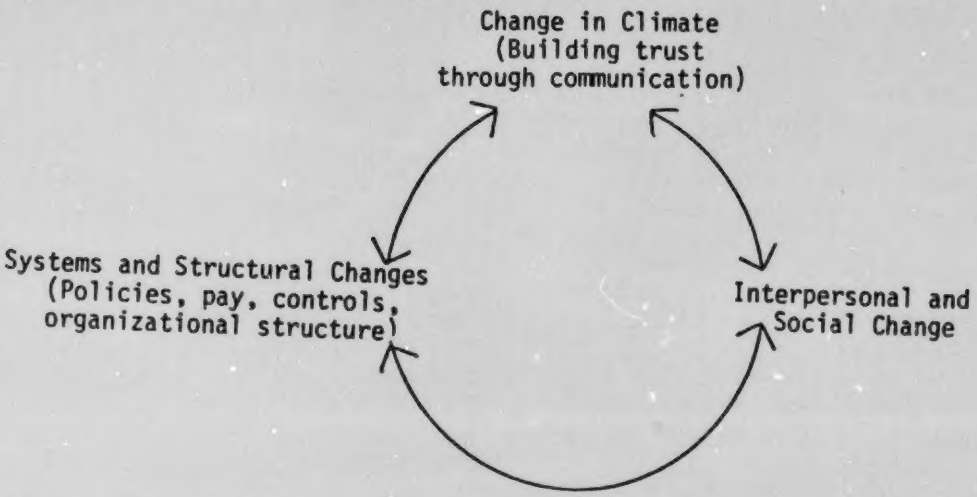


FIGURE 7. INTERDEPENDENCY AMONG SUBSYSTEMIC CHANGES

- Targets of Change

Determination of the target of change is a critical factor in the process of planned organizational change (Katz and Kahn, 1966). Three potential targets are identified in the literature: (1) the individual, (2) the group (including intergroup relations) and (3) the organization. According to French and Bell (1978), organizational development efforts focus on both the formal (goals, technology, structure, skills, financial resources) and informal (attitudes, feelings, values, interactions) systems of the organization. The formal system is the source of legitimacy for the intervention; the informal, the point of entry.

Many theorists appear to believe that the individual serves as a suitable point of entry into the organization (Beer, 1976; Blake et al., 1969; French and Bell, 1978; Golembiewski, 1972; Porter et al., 1975). To the extent that the initial phase of planned change is an "unfreezing" of old attitudes, values and beliefs, the change agent would benefit from interventions directed at the individual. Further, to the extent that member participation and commitment are desirable (and necessary for success), the change agent would

111

do well to win the trust and cooperation of individuals per se (Beer, 1976).

While most theorists seem to accept the individual as a reasonable point of entry into the system, there is a reluctance on the part of most to accept the individual as a target of change. Perhaps the most ardent proponent of individual change in organizational development is Argyris. In a treatise on laboratory education, Argyris (1967) wrote:

> "I believe that any human organization--no matter what its goals--which intends to utilize people as components must, in its design, take into account the nature of the human personality. The more the individual is ignored (Argyris, 1964, 1965), the greater the probability of dysfunctional consequences that will lead to expensive inefficiencies".

He concluded that if the organization is to change, the individual must change.

Blake and Mouton (1969) concurred with a portion of Argyris' argument. Implicit in their method of OD is the assumption that organizational change must start with individual change. However, to effect total system, or organizational change, individual change must be supported by and extended to group change. As Porter, Lawler and Hackman (1975) wrote:

> "The point to be kept in mind when thinking about these types of change approaches, however, is that they are not focused on the individual as the end product of the change process. Rather, such methods should be considered as individually oriented procedures aimed at achieving broader changes in the functioning and effectiveness of the organization".

Planned change efforts may or may not have the added benefit of helping the individual, but such a benefit is secondary to the organization-level objectives (Beckhard, 1969).

Systems theory provides a theoretical basis for the deemphasis of individual change in organizational development. As Katz and Kahn (1966) wrote:

> "The major error in dealing with problems of organizational change, both at the practical and theoretical level, is to disregard the systemic properties of the organization and to confuse individual change with modifications in organizational variables...The assumption has been that, since the organization is made up of individuals, we can change the organization by changing its members. This is not so much an illogical proposition as it is an oversimplification which neglects the interrelationships of people in an organizational structure and fails to point to the aspects of individual behavior which need to be changed."

Within the systems theoretic, the individual is characterized in terms of role--rather than his attitude, feelings, or motivation. Therefore, because it is directed at systematic variables, change should focus on the individual "systemically defined"--or on his role (Katz and Kahn, 1966). While this conceptual framework characterizes much of traditional organizational theory, it has been found inadequate in dealing with issues of motivation, satisfaction, and morale (Berrien, 1976; DeGreene, 1974; Foster and Davis, 1980; Ruben and Kim, 1975). Clark (1972) cautions that the planned change (OD) interventionist should not lose complete sight of the individual in his concern with the system:

> "The role of key individuals is somewhat slighted in the criticisms by exponents of systemic approaches on the place of teaching, seminars, and similar activities. To neglect the influence of individuals is in effect to adopt a definition of the concept of role that is sharply at variance with our current understanding of the individual's strategies in occupying particular roles (see Goffman, 1961; Levinson, 1959; Weick, 1970)."

While individuals can be conceptualized in a systems theoretic (Allport, 1960; Menninger et al., 1963), the general trend in this particular theoretical tradition has been to treat the individual as a group member (Mills, 1964; Ziller, 1965), and so to deal with group rather than individual processes. This orientation characterizes most of traditional change theory. Primary emphasis has been placed on the group as the target of change, the focus of change, and to a large extent, the agent of change (Beckhard, 1969; Beer, 1976; Burke, 1970; Hornstein et al., 1971).

Alderfer (1976) noted the growing concern in systems theory with group processes and group change:

> "The vast literature on group behavior has made relatively little use of open systems theory thinking, although more recently a number of authors have made some use of systems concepts for understanding group concepts (i.e., Mills, 1964; Ziller, 1965)."

Groups exhibit those system attributes which were described earlier as potential foci of change. Groups have boundaries which separate them from their environment and one another; they are composed of subsystems which are susceptible to conflict and communication disturbances; and they participate in goal-setting, adaptive behavior.

Group development techniques, such as team-building, are "probably the most important single group of OD interventions" (French and Bell, 1978). While this is evidenced in the literature to date, there are theorists who sense a need for something more. Clark (1972), an advocate of action research, viewed the current emphasis on group approaches to organizational change as a mid-way stage in the development of the behavioral sciences approach to organizations. The first stage focused on the individual and emphasized the importance of support authority styles. The second, current, stage is a reaction to the problems inherent in the first, especially to the "depressing results of knowledge transfer produced by evaluation research" (Clark, 1972). Attention turned from the individual to the group, and from "learning by preaching" to learning by experiencing. The group approach with its experiential tone was transformed into what has become known as "systemic strategies" (Katz and Kahn, 1966). However, Clark envisioned a third stage already on the horizon, built on "an awareness of a need for more emphasis on the conceptual tool kit of the manager, especially the concepts he uses to examine the social-organizational aspects". (Clark, 1972). Advocates of this conceptual approach argue that managers cannot learn enough about organizational behavior from group experiences alone; they must study the organization _in toto_. An indepth discussion of this so-called "systemic conceptual" perspective can be found in Clark (1972).

- Types of Interventions

The selection of the most appropriate intervention strategy(ies) for a particular organization is a very difficult task, and explicit decision rules to guide that choice are not very well developed (Porter, Lawler and Hackman, 1975). The guidelines proposed by several leading organizational theorists are summarized as follows (Argyris, 1976):

1) that the intervention be based on valid and useful information
2) that the organization and its members have genuinely free choice about the courses of action they select, and
3) that conditions be created that make it possible for organization members to generate internal commitment to the courses of action they do follow.

Beer (1976), in an attempt to categorize the myriad of intervention techniques, identified four major groupings of methods, as follows:

1. Diagnostic Interventions, which depend on data and feedback as a means for changing organizations, to include:
    - Unstructured Laboratory Training
    - Structured Laboratory Training
    - Survey Feedback
    - Interview Feedback
    - Confrontation Meeting
    - Others
2. Process Interventions, which seek change through the development of work groups, to include:
    - Team Development
    - Intergroup Interventions
    - Task Force
    - Third-Party Consultation

3. Environmental Interventions, which change the organization through its structure, technology, and administrative controls, to include:
    - Job Redesign
    - Personnel Systems
    - Financial Control Systems
4. Integrated Interventions, which recognize the need for an integration of various technologies in the change process, to include:
    - Grid OD
    - Interventions which combine any of the foregoing.

Spencer and Cullen (1978) have structured a similar taxonomy, based on that of Beer, which divides the change interventions into ten categories, as follows:

1. Individual Consultation
2. Unstructured Group Training
3. Structured Group Training
4. Process Consultation
5. Survey-Guided Development
6. Job Redesign
7. Personnel Systems
8. Financial Control Systems
9. Organizational Design
10. Integrated Approaches

Because the literature on OD interventions per se is the subject of a major literature review in itself, it seems most useful for the purposes of this review to concentrate on (1) a brief description of the objectives and distinguishing features of each category of interventions and, more importantly, (2) a discussion of the advantages and limitations of the interventions as presented in the research literature. A brief description of each intervention appears below.* Evaluative remarks are presented in a later section of this chapter in which the empirical literature is reviewed.

---

*Detailed reviews of each intervention type are given in Barnes (1969), Bowers (1973), Burke (1977), Dunn & Swierczek (1977), French & Bell (1978), Hellriegel & Slocum (1976), McGill (1977), Pate et al. (1976), Schein (1969), Srivasta et al. (1975).

1. Individual Consultation--Individual counseling has been shown to play a significant role in organizational change efforts (Dayal and Thomas, 1968). Such interventions usually involve a one-to-one relationship between an individual (organization member) and, most often, a third-party consultant. Schein (1969) and Argyris (1965) have emphasized the need to unblock an individual's impedance on the overall change effort by helping him work through his resistance, misperceptions, and maladaptive behaviors and attitudes. Gestalt therapy is one technique which has been shown to be effective in facilitating this type of organizational change (Herman and Phillips, 1971). The key concepts in individual counseling as it relates to organizational change are trust (Argyris, 1971), commitment (Schein, 1969), and self-development (Beer, 1976).

2. Unstructured Laboratory Interventions--Laboratory training first emerged in 1947 in Bethel, Maine, with the National Training Laboratories' (NTL) sensitivity training program developed by Bradford, Benne and Lippitt. Laboratory training (also called T-group and sensitivity training) is designed to confront the participant with new data and experiences which disconfirm his perceptions of himself and his world. The main mechanism for learning is non-evaluative feedback given by other group participants. The disequilibrium resulting from this process frees the individual to develop new attitudes and, hence, new behaviors. At the individual level, sensitivity training increases the potential for individual growth and development by strengthening self-awareness, self-acceptance, and interpersonal competence (Argyris, 1967). At the group level, sensitivity training stimulates a better understanding of group processes as they affect risk-taking, participation, conflict management, decision making, etc. A more realistic understanding of these processes may translate (if enough people attend the laboratory) into more effective group action and, by extension, increased organizational effectiveness (Argyris, 1967).

3. Structured Group Training. The major difference between unstructured and structured group training is the extent of planning and formalization involved in each. Typically, structured group training is conducted around a task, while unstructured laboratories are not. Blake and Mouton's (1964) Grid OD is a prototypical example of structured laboratory training. Group activities result in individual and group behaviors which provide data for analysis and self-examination. Interventions included in this category are: structured educational experiences (e.g., lectures, exercises), instrumental experiences (e.g., tests, surveys), and specific technologies such as TA, Grid Phase 1, MBO, and some aspects of Team Building.

4. Process Consultation. Unlike the laboratory-type training described in numbers 2 and 3 above, process consultation almost always occurs in the organizational setting. Meetings are the most common media used in this type of intervention. During the process meeting, organization members come together to identify and solve common problems. Process consultation can have one of two foci: (1) task, in which emphasis is placed on solving work/technical problems; or (2) interpersonal, in which the emphasis is people-oriented (i.e., on role conflicts, communication barriers, motivation and morale problems). Team building could be included under this category, as it focuses on the development of effective group processes such as task and interpersonal competencies. The objective of team building is the removal of immediate barriers to group effectiveness and the development of self-sufficiency in group process management (Beer, 1976). Three models have been identified in the overall team development approach:

   - Goal Setting: in which the objective is to develop goal-setting skills and facilitate participation in that process on the part of individuals and groups (Beckhard, 1969, 1977; Likert, 1967).

- Interpersonal: in which the objective is to develop increased cohesion, cooperation, support, and commitment within the work team (Argyris, 1965, 1967; Blake and Mouton, 1962)
- Role: in which the objectives are to sharpen the individual's and group's awareness of their role and to establish an effective balance between the differentiation and integration of those roles (Bennis, 1966; Dayal and Thomas, 1968; Guetzkow, 1968; Lawrence and Lorsch, 1967).

5. Survey-Guided Development. Feedback is the key concept guiding this type of intervention. Survey feedback is a widely-used diagnostic technique for gathering and "unfreezing", as well as a frequently used action technology for increasing individual and group awareness of relevant values and behaviors. Questionnaires are the most familiar method used in survey interventions, but are by no means the only--or most effective--technique available (Beer, 1976). Spencer and Cullen (1978) identified three survey-guided development designs in order of increasing effectiveness:

   - data handback, in which data are simply collected and returned to the client without change agent participation in problem-solving;
   - action research, data feedback, and action planning, in which data are collected and fed back to clients in a problem-solving meeting during which goals are set and action steps are planned to implement changes; and
   - concepts training/data feedback/action planning, in which data are collected and fed back in the context of a structured workshop during which participants learn theories of management, the concepts behind the survey, and problem-solving skills, and then practice (using this learning) setting goals and planning actions to improve their work situation.

6. Job Redesign. This type of intervention involves the deliberate, purposeful planning of the job, including any or all of its structural and social aspects. The theoretical stimulus for job redesign was Herzberg's motivation-hygiene theory (Herzberg et al., 1959), which stated that employee motivation will be enhanced if the employee experiences achievement, responsibility, advancement, and recognition in his job. By focusing on the motivating aspects of the job, this framework allows a categorization of various intrinsic job factors into targets for enrichment. Job redesign, including job enrichment and -- though much less successful -- job enlargement, is intended to structure the task and the task environment in such a way as to induce the aforementioned motivators.

7. Personnel Systems. The interventions described in numbers 1 through 6 assume, for the most part, the active participation of a change agent, or consultant. This intervention technique, on the other hand, is implemented through the traditional personnel and management functions. OD interventions in this category include: (1) recruitment, selection, training, and placement of new employees; (2) termination, reassignment, or retirement of existing personnel; and (3) manipulation of rewards and sanctions such as pay, profit-sharing, incentive bonuses, fringe benefits, and other nonmaterial rewards (e.g., titles).

8. Financial Control Systems. Financial control systems, when designed from the behavioral science perspective, have been shown to influence organizational behavior. At the very least, these systems frequently provide a means of tracking and evaluating work group performance. Perhaps the most sophisticated behaviorally-oriented financial control system is the Human Asset Accounting model developed by Likert (1961, 1967). Underlying this approach is the assumption that placing quantitative (dollar) value on the conditions of organizational

processes will influence the decision-making processes and culture of the organization. Other more accounting-oriented techniques are discussed in the literature, such as MIS, PERT, and cost benefit analysis.

9. Organizational Design. There is an increasing awareness of the effects of organizational structure and technology on overall effectiveness. With this awareness, a number of OD interventions aimed at restructuring the organization have developed including matrix organization design, technostructural change, decentralization, and consolidation. Contingency theory has played a major role in this type of intervention, emphasizing the need for congruence between structure (e.g., organic vs. mechanistic), environment (e.g., certain vs. ambiguous), and technology (short-term vs. long-linked) (Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Schein and Greiner, 1977).

10. Integrated Approaches. This is a catch-all category for interventions which include more than one of the methods described above. Many intervention categories overlap, and so methods are in no way mutually exclusive. An intervention may begin with a survey-guided development sequence which stimulates managers to plan for and act to provide management development training, job redesign, decentralization of responsibility, and a Management By Objectives system with bonus incentives. The consultant is seen as a key contributor to OD program planning, especially in achieving an integration of the most relevant techniques during the course of the change effort. Beer and Huse, (1972); Schmuck, Runkel and Langmeyer (1969); Dyal and Thomas (1968); and Waters (1968) reported on the theoretical and research implications of integrated OD approaches.

    Porter et al. (1975) viewed organizational change as a multidimensional phenomenon, thus usually requiring the simultaneous use of more than one approach with a variety of intervention techniques. The major disadvantage with this eclectic approach is that when several techniques/approaches are used, it is difficult to determine the relative importance of each one in effecting and sustaining the change.

As will be discussed in a later section of this chapter, many of the foregoing OD interventions have been applied to the military organization with mixed results. Turney and Cohen (1978) pointed out that a significant part of the difficulty in using industry-oriented OD interventions in the military organization is attributable to the peculiarities of the military institution. Five characteristics, in particular, which differentiate the military organization from its civilian counterpart have implications for organizational development efforts:

- Structure--The hierarchical structure is explicit and visible. Furthermore, the presence of commissioned and non-commissioned officers creates dual chains of command which, at least in peacetime, lead to a tendency to oversupervise the enlisted troops. The emphasis on hierarchical structure demands entry to the system at the top, and the cooperation and commitment of both chains of command casts doubt on the appropriateness of participative techniques, and makes it difficult to move from a focus on officers to a focus on the troops.

- Total Immersion Environment--Personnel are considered to be on duty 24 hours a day. Most support systems are run by the military establishment. This implies a need to extend the scope of interventions beyond the immediate work setting.

- Personnel Rotation. The standard three year tour of duty forces constant turnover and organizational adaption to the desires of new commanders. Since the system is already in turmoil, interventions should not overload the system with stress. At the same time, the loss of key personnel threatens the continuity of change efforts.

- Military-Civilian Dichotomy--Differences in policies affecting military and civil service personnel create conflict between the groups. Consultants are often identified with one group or the other, thereby increasing the difficulty of introducing changes.

- Army Organizational Objectives--The peacetime objective of the Army is to maintain readiness, which makes the measurement of intervention outcomes

> difficult. To the extent possible, interventions should take place in units with functions that do not shift greatly from peacetime to wartime.

Pasmore (1980) has developed an analytical model of OD intervention for military settings based on sociotechnical systems theory which takes into account the unique characteristics of the military organization described by Turney and Cohen. The model proposed by Pasmore is a modification of the traditional sociotechnical systems model put forth by Cummings (1976). A detailed description of Cummings' model can be found in Pasmore (1980). The model consists of eight steps:

1. Defining an experimental system
2. Sanctioning an experiment
3. Establishing an action group
4. Analyzing an experimental system
5. Generating hypotheses for redesign
6. Testing and evaluating hypotheses for redesign
7. Transferring to a normal operating system
8. Disseminating the results.

Pasmore used this framework as a guide and suggested the following revisions for application to a military setting:

- Steps 1 and 2 will either occur simultaneously or be reversed.
- Initially, sanctioning will be limited to the command prerogatives of the highest officer of the unit.
- Informal consent must be obtained from the lowest ranking officers before experimentation.
- Multiple action groups should be established.
- A special set of tools for examining the social and technical systems is required. Both survey and interview techniques should be used, and analyses performed by the lowest ranking officers of the unit.

Summarizing, the steps of the model proposed by Pasmore include:

1. Briefing of levels of command concerning the project
2. Sanctioning the experiment/identifying targets for change
3. Establishing action group(s)
4. Analyzing the experimental system using special surveys.
5. Generating hypotheses for redesign
6. Reviewing hypotheses by command group
7. Testing and evaluating hypotheses for redesign
8. Transferring to normal operations
9. Disseminating the results.

As Pasmore concluded, "the appropriateness of this preliminary model needs to be evaluated through a series of experiments, and revisions made as necessary."

In a 1978 interview with M.M. Cahn, Lt. Col. Nadal gave the following summary remarks on organizational development in the Army (Cahn, 1978):

- "The Army policy says that we will not be dealing with sensitivity training" for three reasons: (1) someone cannot be forced to go to a T-group session; (2) T-groups are so far from Army norms--"the Army is not ready for them;" and (3) the T-group literature reports many mixed results--"the effectiveness of the T-group as a management training device is highly questionable."

- OE training can be recommended by general officers, but the program should remain voluntary. This assures commitment to the program.

- Resistance to OE is "mostly located at the Colonel, Brigadier General, and Major General level...Captains really like OE... The Colonels sometimes are the most resistant for two reasons: (1) they often-times become the recipient of negative feedback...and (2) some of them know that they are not going to be promoted again...I think there are a significant portion of them who feel no inducement to change."

- 80% of the OE effort is at the battalion command level and above. "To do interventions at the level of the PFC is, I think, pretty ambitious... I see the bottom line being the company."
- Team building is the most typical intervention used in the Army. "I don't know of any team building session that has not ended with a favorable outcome."
- "We don't have much reliable data. We have a lot of anecdotal data." The U.S. Army Research Institute is engaged in a multiyear research effort to quantify results of OD and develop a taxonomy of interventions for particular problems.

Evaluation

The chronological and logical position of evaluation in planned organizational change has undergone a great deal of review. Beckhard (1969) pointed out that evaluation, if viewed as an "extracurricular activity" of a change effort, will probably result in a high-cost and low-quality product. Rather, the practitioner should develop an appropriate evaluation strategy prior to commencing a change program. Gowler and Legge (1979) took this recommendation one step further. They suggested that evaluation occur prior to the planning (implementation) mode, so that "it may be used before the event to help define and focus the content of the change activity, and to raise related but neglected questions about implementation and performance."

Evaluation is the method for determining the effectiveness or success of the change effort. It addresses the question of goal attainment. Thus, inputs into the evaluation stage include (1) the problems or "felt need" which initiated the program, (2) the baseline conditions of the organization, and (3) the goals of the program. Kimberly and Nielsen (1975) noted that while the concept of change occupies a major role in the organizational literature and the practice of change (OD) enjoys a similar posture in management circles, "there is a surprising lack of systematic evidence regarding its efficacy, particularly in terms of its impact on organizational performance." The following section of this chapter is a review of the empirical literature which attempts to answer Kimberly and Nielsen's challenge.

B. RESEARCH

Research Design

The empirical literature on planned change deals primarily with the evaluation of the effectiveness, or success, of various OD interventions as initiators and sustainers of organizational change and the relationship of relevant organizational variables to the outcome. If there is one point of consensus in the empirical OD literature, it is on the inadequacy of organizational development research. While technology may be well ahead of theory-building, empirical research is lagging far behind them both. The first, and perhaps most important, deficiency in OD research relates to research design.

White and Mitchell (1976), Porras and Berg (1978), and Spencer and Cullen (1978) have independently analyzed the research designs used in a large number of reported OD studies. Each set of authors established somewhat different criteria for selecting reports for their study, and, as a result, very few reports are included in more than one study. White and Mitchell followed four criteria and, on the basis of these, selected 67 studies covering the period 1964 to 1974 for analysis. The criteria were:

1. The reported research had to be part of an overall, long-range organization improvement program.
2. The author had to include a description, either verbal or quantitative, of the variables considered important to the OD intervention.
3. The article had to include some description of the procedures followed for conducting the research.
4. The research results had to be readily available to the public.

Porras and Berg (1978) selected 35 studies for review covering the 1959-1975 timeframe based on the following criteria: (1) used human-processual interventions, (2) conducted in reasonably large organizations, and (3) measured, at a minimum, organizationally relevant process variables.

Spencer and Cullen aggregated the results of three earlier reviews (Cummings et al., 1977; Pate et al., 1976; and White and Mitchell, 1976). A detailed description of the criteria used by each reviewer is given in Spencer and Cullen (1978). Table 7 below presents the cumulative results of these three major reviews of research designs in OD. It should be noted that because of occasional overlaps in sampled reports, the figures presented should be regarded as approximations only. The purpose of this summary is to uncover trends, hence the use of percentages rather than raw numbers.

TABLE 7. COMPARISON OF OD RESEARCH DESIGNS

Review	Research Design		
	Experimental	Quasi-Experimental	Non-Experimental
Cummings, et al. (1977)	33%	67%	30%
Pate, et al. (1976)	48%	32%	20%
White & Mitchell (1976)	25%	29%	46%
Porras & Berg (1978)	0%	77%	23%

Two generalizations can be made. First less than 50% of the reported research used strong research designs, i.e., designs which include pre-test/post-test measures of both treatment and comparison groups. Therefore, in less than 50% of the cases can causal relationships be inferred (White and Mitchell, 1976). Second, there appears to be a trend toward stronger research designs, though not an overwhelming one. Difficulties persist, especially in field research, in achieving random selection and true control group identification, thus thwarting attempts at true experimental design (Cook and Campbell, 1976; Porras and Berg, 1978).

Cook and Campbell (1976) identified four principal areas threatened by experimental inaccuracies: internal validity, external validity, statistical validity, and construct validity. Internal validity can be jeopardized by history, instability, maturation, testing, instrumentation, regression, mortality, selection, interaction with selection, ambiguity about the direction of causality, diffusion or imitation of treatment, compensatory equilization of treatment, and compensatory rivalry. While the last three threats must be expelled explicitly by the experimenter in any type of research design, the other ten are controlled for by random assignment (hence, the benefit of true experimental designs). External validity, according to Cook and Campbell, is threatened by reactive effects of testing, interaction effects of selection and testing, reactive effects of experimental arrangements, and interaction of treatments.

Cummings et al. (1977) focused on the threats to internal and external validity in 93 research studies of OD programs. Results are reported as the percentage of cases in which a particular threat to validity was not controlled. Several conclusions result from this data:

1. In performance analyses, threats from instability, mortality, and selection-interaction are uncontrolled in 50% of the cases. The mortality problem appears to be a particularly important threat to internal validity (Carey, 1967; Gardner, 1977), especially in the military where turnover is so high (Mobley et al., 1979; Siegfried, 1975; Umstot, 1980).
2. Maturation is an important threat to OD research because certain characteristics (e.g., satisfaction) change over time or over experience (e.g., performance) (Katz, 1976).
3. Because some organizational characteristics have intervening effects on other variables, there is a potential threat from attributing causality to the independent variable rather than the intervening variable (Staw, 1975).

4. Threats to external validity are much less controlled than those related to internal validity. In fact, two of the four threats (interaction between selection and treatment and reactive effects of experiential arrangements) were uncontrolled in over 90% of the cases studied. White and Mitchell (1976) confirmed these findings in an analysis of the percentage (75%) of studies potentially invalidated by the Hawthorne effect.
5. The mere institution of OD programs in an organization may pose a threat to the validity of OD studies because they create expectations, by both managers and employees, that great benefits will accrue from the change effort (Hackman et al., 1978).

Construct validity faces potential threat from seven sources: inadequate specification of constructs, mono-operation bias, mono-method bias, hypothesis guessing within experimental conditions, evaluation apprehension, experimenter expectancies, and interaction of procedure and treatment. Problems of construct invalidity in OD research typically result from (1) hypothesis guessing and evaluation apprehension due to the fear of failure or reprimand on the part of the organization members (Argyris, 1967) and (2) interaction errors resulting from the positive effects of group meetings, open communication, and attention characterizing OD interventions apart from their treatment effects (Spencer and Cullen, 1978).

Statistical validity, according to Cook and Campbell (1976), is a critical factor in experimentation. Many of the threats to statistical validity arise out of the nature of the statistical test itself (e.g., degree of power) and the measuring instrument (e.g., test-retest reliability). Others result from treatment implementation and random irrelevancies in the environment. The latter two threats are particularly a propos to OD research. Because the use of several different techniques during a single program is encouraged, the possibility of invalidity due to comparing different methods--many of which are unstandardized--is increased (Bowers and Hausser, 1977).

The sophistication of statistics applied to OD research results is low in comparison with other psychological studies; but it is growing (Spencer and Cullen, 1978). There is a trend away from the individual as the unit of analysis toward the use of larger units (i.e., groups) of analysis for statistical purposes (Porras and Berg, 1978). This will lead to larger sample sizes and hence a greater probability of internal validity.

Paralleling this trend is a move towards more sophisticated analytical techniques in OD research. White and Mitchell (1976) showed that 50% of the studies reviewed reported results in percent scores without statistical comparisons, 9% in correlations, 15% as statistical comparisons with an experimental group (before-after means), and 25% as statistical comparisons between experimental and control group means. The word "control" must be caveated with the note that in many experiments, the control group was in reality a comparison group, rather than a true control. A later review by Porras and Berg (1978) indicated a trend away from using non-experimental research designs.

While most experimentalists are promoting the use of experimental and quasi-experimental designs in OD research, some believe that the push for a true control group in OD evaluation is futile, if not meaningless (Argyris, 1968). In a classic debate over scientific methodology in OD, Argyris and Dunnette and Campbell emphasized the importance of control groups and experimental design. Dunnette and Campbell emphasized the importance of control groups to scientifically rigorous experimentation and criticized the published research on the effects of laboratory education for its neglect, or omission, of control group design. Argyris countered the Dunnette and Campbell review on the grounds that it attempted to evaluate laboratory education on the basis of "scientific understanding", the rules of which (e.g., control groups) make it difficult to understand the real world. Scientific method imposes an "unreal" framework on the world which confounds what could be observed by less rigorous standards. Argyris pointed out several characteristics of control groups which render them meaningless in OD evaluation studies:

1. Definition: how does one match a particular management figure and his relationships within the company with a control group?
2. Neutrality: how does one control for the feelings and perceptions built up in control group participants discussing innocuous subjects?
3. Maturation: how does one control for the interpersonal competence that increases with the passage of time?

In practice, the issue of control groups has not been resolved; however, the continuing reliance on quasi-experimental designs attests to the practical difficulties of establishing a true control group.

The majority of evaluation studies on the impacts of OD interventions rely on self-report instruments for data collection. There is a substantial amount of criticism of this trend. Milgram (1965), for example, stated that such measures may reflect only the transparency of the instrument or the compliance of respondents. Thus the effect of approval-seeking by respondents in OD evaluations might produce misleading data for assessing the effects of interventions, and this "social desirability" variable may contribute substantially to the variance in OD effects as measured by self-reports (Golembiewski and Muzenrider, 1975; Sudman and Bradburn, 1974).

These arguments raise pertinent questions about the reliability of such widely used self-report instruments as Likert's Profile of Organizational Characteristics. Yet such skepticism concerning the constructs underlying popular instrumentation may also reflect a growing sophistication among organizational researchers about the psychometric aspects of inquiry into planned change (Alderfer, 1977). Nadler, Mirvis, and Cammann (1976), for example, worked with a task force of employees who developed a questionnaire that met their own needs for information rather than the consultants'.

These developments in the approach to research design have been complemented by recent advances in evaluative instrumentation (Alderfer, 1977). U.S. Army researchers have built a questionnaire for diagnosing organizational and job-related areas which may be amenable to intervention

(Shiflett and Cohen, 1975), and have validated a series of measures that might be used to evaluate OD activities in the Army (Cohen and Turney, 1978). Moos (1975) has developed scales for assessing organizational climate in correctional and rehabilitative settings, and Hackman and Oldham (1975) have provided a validated survey for diagnosing jobs and evaluating the effects of job enrichment.

A large portion of organizational development documentation is presented in the form of case studies. In fact, anecdotal, common sense, single case observations comprise the dominant mode of study in the social sciences in general (Campbell, 1975). However, in comparison with its prevalence as a genre for describing organizational life, systematic attempts to develop and utilize the case study as a valid assessment tool have been negligible.

As a vehicle for evaluation, the case study in general is both promising and problematic. Its value becomes evident in a number of ways. (1) It provides a continuous picture of the interactive developmental process (Friedlander and Brown, 1974). (2) Because of its prevalent use as a documentation of change programs among consultants, sponsors and organizational members, it provides multiple sources of information from which experiences can be drawn and compared. (3) It builds a more adequate basis of communication among groups with conflicting frames of reference. (4) It has a definite methodological rationale; when analyzed retrospectively (through such procedures as frequency counts, content analysis, and the continuous coding and comparison of case materials), the case study offers an effective means for increasing both internal and external validity. It thus can be applied evaluatively to assess successful and unsuccessful change efforts. (5) It improves the quality of findings obtained from given change efforts, findings from which grounded theories of planned change can be generated and upon which meaningful quantitative generalizations can be based (Campbell, 1975).

Dunn and Swierczek (1977) have attempted to demonstrate the potential of case study in planned change research. The most pressing problem they identified in the field of planned organizational change is the gap between theory and practice. To bridge this gap, they proposed the development of a "grounded theory" of change, based on the results of retrospective case analysis. In this way, theory and practice would converge in "reality." Their landmark work towards this end is a review of 67 successful and unsuccessful change efforts in terms of eleven commonly accepted hypotheses found in the theoretical literature.

The results of the Dunn and Swierczek study are important for their mixed implications. Of the eleven major hypotheses tested, only three found low to moderate empirical support. These were:

- Change efforts in which the mode of interpretation is collaborative will be more successful than change efforts undertaken with other modes of intervention.
- Change efforts in which the change agent has a participative orientation will be more successful than change efforts in which change agents share a different orientation.
- Change efforts employing standardized strategies which involve high levels of participation will be more successful than those which involve low levels of participation.

The other eight hypotheses received insufficient empirical support. While the authors admitted their own methodological inadequacies (e.g., small sample size, use of bivariate analysis), they believed the following five generalizations about the methodology of OD research to be valid:

1. Theories have been received largely on an *a priori* basis with little attention to the empirical grounds of theoretically derived expectations about change efforts.
2. Efforts to compare expectations with empirical evidence have tended to assume the form of single case studies or comparative studies involving small convenience samples.
3. Methodological controls have been weak or nonexistent. Potentially interfering variables are regularly assigned to a broad *ceteris paribus* clause.
4. A commitment to case studies as the preferred mode of analysis belies an implicit interest in the generalizability of findings. Theories of planned change

have been based on strong inferences about the representativeness of findings, but without the use of sampling procedures and statistical controls.

5. Despite a commitment to qualitative analysis, investigators typically evidence a strong interest in discovering patterned relationships which can be employed as a basis for ex ante strategies of planned change.

A mixed evaluation of the case study for organizational change research characterizes most of the literature. On the positive side, the case study serves two unique and important purposes: (1) it facilitates the inductive development of new theory, and (2) it facilitates the refinement of current theory (Walton, 1972; Bennis, 1969). However, on the negative side, the case study has shown greater potential than other more "rigorous" methods for distortion due to the difficulty many authors seem to have in distinguishing fact from opinion, description from analysis. The crux of the problem is the human variable, i.e., the fears and biases of the case study reporter. While especially visible in the case study, these "unscientific" or "non-rigorous" limitations affect, to some degree, all human inquiry.

The case study appears to have considerable potential for evaluative application in the area of OD. In order for this potential to be realized, however, three main shortcomings must be ameliorated. First, the data provided by continuous documentation of the interactive processes which occur are mitigated by the fact that the case study provides no immediate feedback to guide subsequent action steps in a given OD effort (Friedlander and Brown, 1974). Second, without procedures to insure its comparison with a range of case materials, the single case study has little external validity; that is, it does not increase our understanding of the variables present in a universe of change efforts. A third and related problem is that the single case study, if considered in isolation from other case materials, rests largely on the perception and bias of an independent writer.

Golembiewski, Billingsley, and Yeager (1976) made a substantial conceptual contribution to evaluation research by defining alpha, beta and gamma change. Alpha change denotes changes detected with a consistent measuring scale; beta change, changes in which subjects recalibrate the measurement scale; and gamma change, changes whereby the subjects change their understanding of the variable being measured. The authors' intention was to show that the measurement of change involves more than simply comparing means or variances of two or more sets of observations collected over time. A detailed discussion of this conceptualization of change can be found in Golembiewski et al. (1976) and Zmud and Armenakis (1978). Empirical support for the model is given in a study by Armenakis and Zmud (1979), which examined these types of change by administering the Survey of Organizations to a sample of military trainers involved in an OD program and a control group. The findings indicated that the changes occuring with the OD interventions could be better evaluated in the alpha, beta, gamma typology.

Research Findings

Several thorough reviews are available which analyze the results of OD evaluation studies. Among the most widely recognized are those by Beer (1976), Bowers (1973), French and Bell (1978), Friedlander and Brown (1974), and Porter et al. (1975). Rather than reiterate the findings of these reviewers, the following discussion will address several key issues confronted in the literature.

There appear to be two principal approaches to the evaluation of OD intervention effectiveness. The first, and most prevalent, focuses on the intervention itself. Generally speaking, the intervention is regarded as a type of independent variable. The effectiveness of the OD intervention is its measurable effect (i.e., ability to change) on the dependent variable, i.e., the targets of change. Presented below are the major research findings on the effectiveness of some of the most widely used change interventions.

Survey Feedback

Friendlander and Brown (1974) indicated that the research literature on survey feedback evidences usefulness as an effective bridge between diagnostic activities and active interventions. Its primary effects appear to be on the attitudes and perceptions of individual organization members.

While improvement in these factors may enhance the readiness of the organization to change, however, these authors believe that "longer-term changes in individual behavior or organizational performance appear to be contingent on more than just survey feedback " (Friedlander and Brown, 1974).

Mann (1961) applied a survey feedback technique to 800 employees and 78 managers in a single department of an organization and found positive attitude changes in the experimental groups. Mann concluded that survey feedback had its greatest results when the survey results were discussed at more than one management level. He believed organizational involvement was a key ingredient of successful change.

Solomon (1976) reported results of a survey feedback intervention in a university which indicated that survey feedback is perceived as being most effective in creating change when the information conveyed is negative, as opposed to positive. He explained this finding by noting that positive information does not provide impetus or direction for movement, while negative information does. Survey feedback, therefore, seems most suitable for "organizations in serious trouble". (Solomon, 1976).

Bass (1976) has developed a survey feedback technique which has gained empirical support in a series of experiments. The principal instrument used is the Bass-Valenzie PROFILE which gives individualized feedback to participating managers about the system of inputs, superior-subordinate relations, and outputs of their own workgroup. In this way, it offers the opportunity to systematically examine how the effectiveness of a particular management style depends on the organization, task, and interpersonal relationships among the subordinates and the manager. The Bass-Valenzie survey feedback method is very similar to the University of Michigan standardized effort in technique and objective. As Bowers (1973) reported, a study of 14,812 employees in 23 organizations using the University of Michigan approach strongly attests to the cost/effectiveness of survey feedback relative to other OD approaches.

Less positive effects from survey feedback have been reported by Miles et al. (1969) and Brown (1972). Studying the effects of survey feedback on power equilization, communication and norms in a school system, Miles et al. found some improvement in communications, no change in norms, and some negative effects in power equalization. Brown, also in a school setting, found no impacts on factors of emotionality and curiosity, but some enhancement of student involvement.

Major research results on the positive effects of survey feedback can be summarized as shown in Table 8.

TABLE 8. KEY FINDINGS ON EFFECTIVENESS OF SURVEY FEEDBACK

Key Findings	Research Studies*
- Facilitates data gathering and reduces resistance to change	- Chase (1968); Klein et al. (1971); Alderfer & Ferris (1972); Brown (1972)
- Improves organizational climate	- Brown (1972); Miles et al. (1969); Mann (1961); Bowers (1973); Pasmore & King (1978)

* Studies cited in Bowers (1973), French and Bell (1978), Porter et al. (1975) or this report.

Job Design

Job design (including job enlargement and enrichment) represents the task-oriented or socio-technical approach to planned change. Key findings relating to its effectiveness in organizational development are presented in Table 9.

TABLE 9. KEY FINDINGS ON EFFECTIVENESS OF JOB DESIGN

Key Finding	Research Studies*
- Reduces absenteeism and turnover	- Ford (1969); Hackman & Lawler (1971); Turner & Lawrence (1968)
- Increases quality of work (production level unchanged)	- Wanuous (1973); Standing (1973); Hackman & Oldham (1971); Pasmore & King (1978); Conant & Kilbridge (1965); Davis & Werling (1960); Davis & Volfer (1965)
- Increases satisfaction	- Hackman & Oldman (1971, 1975); Umstot et al. (1976)

*Studies cited in French and Bell (1978), Friedlander and Brown (1974), Hackman and Oldman (1971, 1975) or this report.

Positive results of job enrichment studies indicate that job enrichment will increase commitment and satisfaction, as well as the productivity of the employees (Hackman and Oldman, 1975). These benefits have been attributed to increased levels of certain job characteristics, such as task variety, job significance, job autonomy, and feedback (Hackman and Lawler, 1971; Hackman and Oldham, 1976). It is also argued that these effects are strongest for those individuals with high needs for achievement and growth (Oldham, Hackman and Pearce, 1976; Steers and Spencer, 1977; Stone, Mowday and Porter, 1977). Job enrichment has also been found to have more positive effects in situations where employees received positive social cues from their co-workers (White and Mitchell, 1979).

Research has shown that individuals reacting to job enrichment are moderated by their levels of higher-order need strength (Hackman and Lawler, 1971; Wanous, 1974; Giles, 1977). It appears from these three studies that persons with higher-order need strength react more positively to job enrichment. Hackman and Lawler (1971) found that job enrichment should appeal most to those persons who, in addition to seeking satisfaction of higher-order needs, also experience psychological rewards as a result of good performance. These findings were replicated in the Wanous and Giles studies.

Several criticisms have been raised about the job enrichment approach. Reviews of the empirical literature on enrichment suggest that the effects of this intervention are often very weak (O'Reilly, 1977; Pierce and Dunham, 1976; Salancik and Pfeffer, 1977). Also, empirical results show that while job enrichment may have some effect on satisfaction, it has very little, if any, effect on productivity (Pierce and Dunham, 1976; Umstot, 1980; White and Mitchell, 1979). Salancik and Pfeffer (1977) attacked the theoretical basis of job enrichment, suggesting that social cues may be better predictors of employees' satisfaction and motivation than objective job characteristics. White and Mitchell (1979) empirically demonstrated that both job satisfaction and motivation were significantly affected by social cues and unaffected by job enrichment, thus lending support to Salancik and Pfeffer's objections.

Friedlander and Brown (1974) reported that the results of studies on job design (enlargement and enrichment) indicate increased quality of production, lowered absenteeism and lowered turnover. In terms of attitude change, the results are mixed; while job satisfaction tends to increase as a result of job redesign, workers tend to become more socially isolated and, hence, there is an increased difficulty in relation to co-workers and superiors. Two major problems with job design research are identified in this review. First, while changes in job design generally entail simultaneous changes in task variety, responsibility, challenge, etc., research has not attempted to deal with each of these factors as independent variables. Second, the research has not explored fully the relative changes in different types of motivation and satisfaction, nor the relative effects of participation and non-participation in the change process.

Hackman, Pearce and Wolfe (1978) reiterated the first problem identified by Friedlander and Brown. According to these authors, job redesign activities invariably involve changes that extend beyond alterations in job characteristics themselves. While such non-job changes may reinforce improvements made in the job itself, they also increase ambiguity about what actually caused any changes found in work attitudes and behaviors.

Glaser (1976) criticized job enrichment studies on the basis that most of the empirical support is derived from "case studies and uncontrolled research." Umstot (1976) supported this view, being able to identify only 13 controlled field and laboratory experiments on the effects of job enrichment. The overall findings of Umstot's review are that there is moderate support in the empirical literature for the enrichment-satisfaction relationship, but somewhat weaker support for the enrichment-productivity relationship. This conclusion is in general agreement with that reached by Friedlander and Brown (1974). As seems to be the case with many OD research studies, there appears to be a lack of statistical sophistication in the analyses of job enrichment programs.

Team Development (Team Building)

A team development intervention is designed to improve the effectiveness of the work group. It is probably the most widely used action intervention. The following studies represent evaluation research findings on team development.

TABLE 10. KEY FINDINGS ON EFFECTIVENESS OF TEAM BUILDING

Key Findings	Research Studies*
• Improvements in Performance	- Beckhard & Lake (1971); Blake, Mouton, Barnes & Greiner (1964); Bragg & Andrews (1973); Kimberly & Nielsen (1975); Luke, Block, Davey & Averch (1973); Marrows, Bowers & Seashore (1967); Nadler & Pecorella (1975)
• Increases in Participation	- Bragg & Andrews (1973); Brown, Aram & Bachner (1974); Friedlander (1967); Nadler & Pecorella (1975); Schmuck, Runkel & Langmeyer (1969), Woodman & Sherwood (1980)
• Improvements in Organizational Climate	- Bigelow (1971), Fosmire, Keutzer & Diller (1971); Golembiewski (1972); Luke et al. (1973)
• Increases in Satisfaction	- Hand, Estafen & Suns (1975), Hautaluoma & Gavin (1975), Kimberly & Nielsen (1975), Marrow et al. (1967); Schmuck, Murray, Smith, Schwartz & Runkel (1975), Woodman & Sherwood (1980)

*Studies cited in Friedlander and Brown (1974), French and Bell (1978), Kimberly and Nielsen (1971) or this report.

The conclusions reached by Friedlander and Brown (1974) regarding the effects of team development on participant activities and behavior are generally quite positive. Woodman et al. (1980), however, took a more cautious position. Their skepticism stemmed principally from a belief that the overall internal validity of available research is not impressive in terms of drawing specific conclusions about team development. Threats to internal validity relate primarily to (1) small sample sizes, (2) absence of control groups, and (3) lack of random assignment. While Woodman emphasized the need for more rigorous designs in studies evaluating team development activities, he recognized the dilemma (stated earlier by Argyris) in attempting to apply rigorous methods to an evaluation of OD programs. In strengthening the methodological aspects of the research, more rigorous methods "carry with them contraints which may affect the generalizability of any results."

The central role of the leader in successful organizational change has been emphasized in the literature in terms of both his involvement and support (Mann, 1961; Dalton, 1969; Guest, 1962; Blake, Mouton, Barnes and Greiner, 1964; Golembiewski, 1972; Argyris, 1973). Boss (1978) demonstrated this notion empirically in a study of seven teams in a six-day team building session. Six of the teams met without the Chief Executive Officer of their organization, yet experienced the same design and constraints as the team with its leader present. Results indicated that growth occurred in the team with the leader as measured by the Likert Profile of Organizational and Performance Characteristics and the Group Behavior Inventory; the six leaderless teams either regressed or remained unchanged. Further research is recommended to confirm that the difference found is accountable to the presence of a leader.

Several authors have noted the lack of comparative research on the wide range of available organizational development techniques (Friedlander and Brown, 1974; Kahn, 1974; Srivasta et al., 1975; Kimberly and Nielsen, 1975; Pasmore and King, 1978; Porras, 1979). Such research is necessary in order to determine which intervention or combination of interventions would be most effective given a particular set of problems, environment, client-system demands and "felt needs," time constraints, etc. (Nadler and Pecorella, 1975). A few notable exceptions are discussed below.

Bowers (1973) conducted one of the most significant comparative research studies of OD techniques and their results. His work was based on data from 14,000 respondents in 23 industrial organizations and reports gain scores on four OD methods: Survey Feedback, Interpersonal Process Consultation, Task Process Consultation, and Laboratory Training, along with two control treatments. Results indicate that

> "Survey Feedback was associated with statistically significant improvements on a majority of measures, that Interpersonal Process Consultation was associated with improvement on a majority of measures, that Task Process Consultation was associated with little or no change, and that Laboratory Training and No Treatment were associated with declines." (Bowers, 1973).

Kahn (1974), while applauding Bower's intent, criticized the study on many fronts, including (1) problems with raw gain scores, (2) problem of self-selection of treatment by client and change agent, and (3) absence of hard criteria of organizational change.

Pasmore and King (1978) reported the results of a 2½ year action research project designed to investigate the differential impacts of sociotechnical system, job redesign, and survey feedback interventions on a variety of attitudinal and performance measures in comparable units of an organization. Their results can be summarized as follows: (1) The multi-faceted interventions did not differ in terms of their impact on employee attitudes; (2) combined technostructural and survey feedback interventions produced more positive effects on attitudes than did survey feedback alone; and (3) only sociotechnical system intervention was directly associated with major productivity improvements and cost savings. Pasmore and King did not recommend an abandonment of human processual interventions, but rather a more balanced and system-wide approach to organizational change whereby both attitudes and interactions (people-technology, person-person) can be enhanced. This requires further analysis of different combinations of interventions as to their multivariate effectiveness in different settings.

Gavin and McPhail (1978) reported the results of a comparative OD effort carried out in the service department of a midwestern university by a team of eight change agents. Interventions included interviews, questionnaires, data feedback, and team building exercises. Changes assessed by questionnaires in a pretest-posttest design over a 1-year interval included: (1) increase in employee's sense of power; (2) increase in role strain, decrease in role stress; (3) no change in organizational climate measures. The authors concluded that narrow band interventions might have more visible effects than those resulting from global change strategies. "Substantive 'organizational' change may be an unrealistic goal". Few organizational development practitioners have the luxury of the five (e.g., Likert, 1961) or fifty (e.g., Maslow, 1965) years required for "real" organizational change.

Porras (1979) conducted a study of the empirical OD research literature to determine the comparative impact of the more common change techniques and varying intervention intensities. The data source was comprised of 35 empirical studies. Porras selected eleven hypotheses drawn from current OD theory and practice and tested each with the data generated from an aggregated analysis of the data pool. His findings indicated that most of the predictions were not supported by the available doubts. This rift between theory and research proposed by Porras should be tempered by the admitted possibility that "the methodology used in this analysis created artificial results". However, Porras' study does, at a minimum, bring into question many of the OD principles previously taken for granted, lending support to the call for more rigorous research in this area.

> "Some (OD principles) may not be valid. Others may be correct. In any case, all should be reassessed in a rigorous, systematic manner. Central to the development of our field is a high degree of confidence in the basic theories we espouse" (Porras, 1979).

An alternate approach to the evaluation of successful and unsuccessful organizational development shifts attention from the intervention per se to the dynamics of the organization within which it is conducted. This orientation was taken in a review of OD evaluation research by Franklin (1975). In a report for the Office of Naval Research's Organizational Effectiveness Research Program, Franklin evaluated several characteristics of organizations, their environment and development efforts, to determine their association with successful and unsuccessful change in 25 organizations. The theoretical basis for this orientation to OD evaluation is Franklin's proposition that certain factors may exist which influence the success of OD efforts "regardless of the application of any particular change strategy or technique. That is, just as some specific strategies were found to be generally more effective than others, it may be possible to identify characteristics of the organization and development process which influence the success or non-success of OD activities...As Kahn (1974) noted, most characteristics of this nature that have been suggested have not been subjected to empirical evaluation. Further, very few characteristics ever have been suggested as having substantial effects on the outcomes of development efforts. The single precedent for this study was conducted by Bowers (1973), who examined OD efforts in 23 organizations. Along with differences identified across strategies, Bower's results indicated a relationship between organizational conditions and the outcome of OD efforts. The principal factor shown to affect the impact of change strategies was organizational climate, i.e., conditions internal to the organization which influence behavior and attitudes.

Franklin identified four groups of characteristics differentiating successful and unsuccessful OD efforts, as shown in Table 11. His conclusions, based on these results, can be summarized as follows:

Characteristic	Relationship to Success of OD Effort
1. Nature of Change Activities	Commitment to and use of survey feedback and interpersonal process consultation interventions are associated most closely with success in OD efforts while an emphasis on sensitivity training/T-groups is most closely associated with the unsuccessful organizations.
2. Stability of the Organization and Posture Toward Change	Organizations that are more stable and staid are less likely to be successful in their OD efforts than are those which are expanding and more open to and involved in adjusting to change.
3. Specificity of Interests and Commitment to Change Effort	More specific interests and greater commitment to the OD efforts are associated with successful change.
4. Qualities of the Internal Change Agents	Internal resource persons who are less carefully selected, receive change-agent training previous to the OD effort, and do not possess assessment-prescriptive skills are found in the unsuccessful organizations.

TABLE 11. CHARACTERISTICS INDICATING DIFFERENCES BETWEEN SUCCESSFUL AND UNSUCCESSFUL CHANGE IN ORGANIZATIONS

(from Franklin, 1975)

Category	Successful	Unsuccessful
Organization's Environment	• Expanding market • Labor drawn from suburban areas • Higher pay rate	• Steady market • Labor drawn from towns • Lower pay rate
Organizational Characteristics	• More levels of hierarchy • Heavy industry organizations • Innovative reputation	• Fewer levels of hierarchy • Office and sales organizations • Non-innovative reputations • Non-union • Insurance industry
Entry and Commitment	• Interest based on prior contact with research/development staff • Commitment to Survey Feedback Strategy • Greater support from top management • Research/development staff introduced as part of general presentation • Expression of a specific problem	• Interest not based on prior contact with research/development staff • No commitment to Survey Feedback Strategy • Lesser support from top management • Self-introductions by research/development staff • Expression of a general problem • Not motivated by a desire to experiment with new ideas
Internal Change Agent	• ICA's possessed assessment-prescriptive skills • More care taken in ICA selection	• Did not possess assessment-prescriptive skills • Less care taken in ICA selection • Previous ICA training • More previous work experience in personnel department
Change Activities	• Commitment to Survey Feedback and Interpersonal Process Consultation strategies • No commitment to Sensitivity Training/T-group strategy • Process plus content emphasis of interventions • Internal change agent primarily responsible for interventions • Use of Survey Feedback intervention	• No commitment to Survey Feedback or Interpersonal Process Consultation strategies • Commitment to Sensitivity Training/T-group strategy • Process only emphasis of interventions • External agent primarily responsible for intervention

Franklin caveated these generalizations with the statement that a strong case cannot be made that any of these characteristics are necessary or sufficient determinants of a successful change effort. Their identification does have, however, a practical value to the individual manager or consultant. Certain of these characteristics are alterable (e.g., support of management, change agent selection, level of commitment) and hence may be significantly affected by the manager or consultant. Others are unalterable and only minimally under the control of the organization. Unfortunately, the novel element of Franklin's study, i.e., those organizational conditions which affect OD outcomes (e.g., hierarchy, environment) generally fall under the "unalterable" category. Many characteristics of the development process, however, are subject to the actions of management, as shown in Table 12.

OD in the Military

Despite the many difficulties encountered, organization development efforts have been carried out in the military on a large scale with a fair amount of success. Umstot (1980) has reviewed the major OD programs attempted in each Service and the research relating to the results achieved. Table 13 summarizes his findings.

Umstot's data suggests that, at best, the results of these efforts have been mixed. Other research supports this notion, as shown below.

Researcher	Intervention	Results
Fry & Cliborn (1975)	Management skills workshop	no discernible impact
Siegfried (1975)	Survey-feedback/Team Building	no performance impacts no lasting attitude change
Olmstead et al. (1978)	Process Interventions	improvements in combat effectiveness
Cohen & Turney (1978)	Communication Processing Teams	positive changes in performance orientations
Holmes et al. (1978)	Survey Feedback	no significant results
Emington (1978)	Survey Feedback	improved retention rates

TABLE 12. ALTERABLE AND UNALTERABLE CHARACTERISTICS

(from Franklin, 1975)

	Differentiating Characteristics[a]	Characteristics with Differentiating Trends[b]
Alterable Characteristics	• Support from top management • Introduction of research/development staff • Specificity of problem expression • ICA's assessment-prescriptive skills • Care of ICA selection	• Negotiation Period • Commitment for a resurvey • Commitment for a restructuring of the organization • ICA knowledgeability of organizational functioning and change-agentry • ICA value orientation • ECA knowledge base • ECA value orientation • ECA skill types • Credibility of survey instrument
Unalterable Characteristics	• State of the market • Origin of the labor pool • Industrial pay rate • Levels of hierarchy • Type of organization • Innovative reputation • Prior contact with development/research staff • Early vs. late involvement • Previous ICA training	• Scope of the market • Size • ICA non-change-agent experience

TABLE 13. OD PROGRAMS IN THE MILITARY

(adapted from Umstot, 1980)

Branch	Type OD Program	Results	Remarks
Army	OE - defined as "the military application of a technology... derived from successful leadership and command practices and applied behavioral and management sciences using consulting services and direct involvement of the chain of command" (Nadal et al., 1977)	• As of 1979, Chief of Staff was pleased with results	• "Empirical studies of OE are almost non-existent." Barriers include: (1) attempt to decentralize OE program; (2) non-standard nature of interventions
	Survey Feedback, Team Building & Job Enrichment (Cohen & Turney, 1978)	• Positive, but qualified, results from job enrichment; no effects from SF or TB. (n=154)	
	Team Building (Patton & Dorey, 1977)	• Testimonial evidence only; positive effect	
Navy	Human Resource Management, based on survey-guided development	• Participation in HRM process may have short-term effects on retention, but the effects may not last (Drexler Y Bowers, 1973; Crawford & Thomas, 1978) • The more effective the management, the lower the disciplinary rate (Crawford & Thomas, 1977) • Participation in the HRM process increased the overall ship readiness (Ellermeirer & Curtis, 1978)	• "Almost complete lack of published empirical evidence that HRM actually changes the organization"
Air Force	Laboratory OD	• Results are mixed. An early (1973) study with no baseline data (n=183) showed significant improvement in decision-making, communications, goals, and cooperation (McNichols & Manley, 1976). However, a later (1975) study (n=201) showed only slight improvements in leadership and communications, and decreases in the other factors (McNichols & Manley, 1976). The differences are believed due more to a change in environmental factors than by the OD program.	
	Matrix Team Building	• No empirical results; judged by managers and consultants to have been effective	
	Survey Feedback	• Inconclusive results; co-location of experimental and control groups caused problems limiting effectiveness of the program (Lloyd, 1977)	
	Orthodox Job Enrichment (OJE)	• Generally positive results have been reported for the over 350 OJE programs currently being held. Major improvements occur in cost savings and job satisfaction (Herzberg & Zautra, 1976)	

Umstot (1980) pointed out that the turnover of key management during the experimental process makes rigorous experimentation nearly impossible. For example, in a study attempted by Crawford (1977), over 50% of the ships changed both commanding officers and executive officers during the experiment. An additional confounding effect results from the impact of "rigorous" research on the OD program. This phenomenon affects both the civilian (Argyris, 1968) and the military setting (Umstot, 1980).

Nadal, Schwar, and Blascak (1978) studied the experience of select Organizational Development user corporations and compared the results with the Army experience in Organizational Effectiveness. Data was gathered from a literature search through interviews with corporate personnel and academicians well known in this field. The Army effort, to the extent that it has developed, compared favorably with the corporate early experience and seems to have the capacity built into its process to manage the change of the process itself. Nadal et al. concluded that the Army was not doing two pertinent levels of OD which the corporations visited were doing: (1) the Strategic OD, accomplished to systematically address the organizational future in a participatory way, and (2) the Socio-Technical areas of OD which are executed to enhance jobs, redesign work, and increase organizational productivity at the worker level. Recommendations are made that the Army should expand its process, change the role of the OESO and the content of the OETC, educate managers/commanders at all levels and develop a survey feedback system in order to accomplish Strategic and Socio-technical functions to vertically integrate the organizational development process in the Army.

Spencer and Cullen (1979) developed detailed case studies of organizational development interventions with Army organizations and analyzed them to identify those variables which predict or are associated with successful interventions. Their findings can be summarized as follows:

1. Outcomes.

   - The outcome results of OE operations are absent or limited to the documentation of behavioral changes in the client system in most cases. Successful OE operations do generate concrete behavioral outcomes, although these results tend not to be documented or quantitatively measured.
   - Implementation and Evaluation remain the weak points in the Army OE APIE (Assessment, Planning, Implementation, and Evaluation) procedure. OESOs rarely collect data in any systematic way on the outcomes of their interventions.

2. OE Consultants.

   - Effective OESOs are significantly more likely to:

     (a) Gain meaningful client acceptance and commitment through accurately hearing client concerns and needs and developing an intervention approach congruent with those concerns;
     (b) Identify realistic implementation action steps to solve organizational problems;
     (c) Be concerned with outcome results and follow up with clients to document such results.

3. Client.

   - OE operations were most effective in mid-level operational commands, line combat units in which the client sponsor had the power and authority to change organizational processes. OE operations were less effective in (1) organizations undergoing major leadership transitions (when the OESO did not have an explicit contract to deal with the transition issues), and (2) civilian agencies and large complex headquarters systems headed by general officers.

4. Intervention Methods.

   - The OE operations studied revealed a very restricted range of intervention methodologies. Basically only two were observed: process consultation (including action planning and transition workshops) and survey-guided development methods. It is possible that socio-technical or "open systems" strategic policy planning methods more relevant to the situations faced by top management would lead to a higher success rate with large systems clients.

5. Intervention Process.

   - Effective OE cases are characterized by good diagnosis and clear, parsimonious data feedback on real issues.
   - High quality goal setting and the identification of specific implementation action steps is crucial to achieving meaningful results on outcomes operations. OESOs must reality-test implementation options with their clients.

A major criticism levied against OD interventions carried out in the military setting is the apparent lack of penetration into the troop level (Cohen and Turney, 1978). Three systematic research studies recently conducted to examine the impact of various OD techniques illustrate this point. In the first case, Fry and Cliborn (1975) examined the utility of a series of three leadership skill development workshops for changing organizational performance. The three workshops focused on: (1) group problem-solving, (2) Management by Objectives (MBO), and (3) performance reinforcement. The experimental design utilized an experimental and control group of key officers (n=153 per session) in a variety of units. Data was collected through surveys administered to available troops. The conclusions of this study indicated that the workshops were not effective; the officers in the experimental group did not utilize the skills taught in the workshop to any greater extent than did officers in the control group.

Similar results were found by Holmes et al. (1978) in their evaluation of a Survey Feedback program in 60 Army companies. The company commanders were trained to use survey feedback data to improve subordinate work perceptions and attitudes. No significant changes were evident as a result of the intervention. Another study examining the results of a Survey

152

Feedback effort yielded similar, though somewhat more positive, results (Siegfried, 1975). This study involved the collection of survey data from battalion members (n=110) to commanders as a basis for a 2- or 3-day team building workshop. Differences in commander sensitivity and support were found between experimental and control groups. A follow-up study four months later confirmed these positive changes, but a second follow-up six months after the first showed a reversal in the trend. The author concluded that these findings indicate the need for intense follow-up to reinforce initial OD interventions. The same could also be said of the Holmes et al. (1978) study. The authors of that study concluded that survey feedback would more likely produce changes if conducted over an extended period of time and in conjunction with other OD techniques.

The principal drawback to each of the foregoing studies is their "minimal penetration...into the units themselves to attempt to tie the officer training to specific problem areas and reinforcement needs of the personnel at lower levels (Cohen and Turney, 1978). The dilemma stated here is by no means peculiar to the military. Kahn (1974) cited as one of the most cogent problems facing OD the redundant advice that the change agent "start at the top" (Beckhard, 1969; Blake and Mouton, 1969). Kahn's contention was that OD theoreticians and practitioners have not dealt adequately with the issues of level of change, extent of participation by each level, and management support for vs. focus of the planned intervention.

Cohen and Turney (1978) conducted a research study to evaluate the impact of a variety of OD techniques in an Army organization by focusing the interventions on the troops themselves. The study was conducted at an Army communications facility, using four work groups, each comprised of 2 NCOs and 14 enlisted persons. Seven problem areas were identified for attention (lack of peer group norms, insufficient performance feedback, need for supervisory training, role conflict/ambiguity, inadequate intergroup communications, lack of motivating job content, ambiguous performance evaluation standards) along with four strategies for addressing them (survey feedback, team building, management training, job enrichment). The results of the study showed that a series of OD techniques introduced to an Army organization at the lowest structure level can yield significant positive changes in soldier job satisfaction and performance. The conclusion reached by the authors is that, whatever the combination of OD techniques one uses, OD in terms of training provided outside the organizational setting is not a fair test. Before evaluation can take place, it is necessary to assure that some form of OD in fact penetrates into the organization itself and involves personnel who are directly responsible for the performance and job satisfaction which are being measured.

Management Development/Training

A category of change interventions related to, but distinct from, organizational development has been shown to have an effect on planned change. These interventions are collectively referred to as management development/training programs. Like OD interventions, these programs typically result in adaptive changes in the processes of organizational behavior; however, unlike organizational development techniques, they focus on one subsystem of the organization (Bennis, 1969; Beckhard, 1969).

Koontz and O'Donnell (1977) distinguished between management development and training in the following way:

> "Manager development concerns the means by which a person cultivates those skills whose application will improve the efficiency and effectiveness with which the anticipated results of a particular organizational segment are achieved. Learning about the skills takes place in training situations, whether in the classroom, in a conference, or in a managing experience; skill in managing can be developed only by managing, and thus manager development must always be self-management."

Management training techniques include such approaches as: T-group or sensitivity training, Grid OD, Management-by-Objectives (MBO), and a variety of workshop and conference programs using academic or psychological approaches. Koontz and O'Donnell also suggest on-the-job, or process, training as a viable, experiential approach to management development.

Sensitivity Training

T-Group, or sensitivity, training for managers follows the same principles as when it is applied to other organizational members. It also shares many of the same limitations:

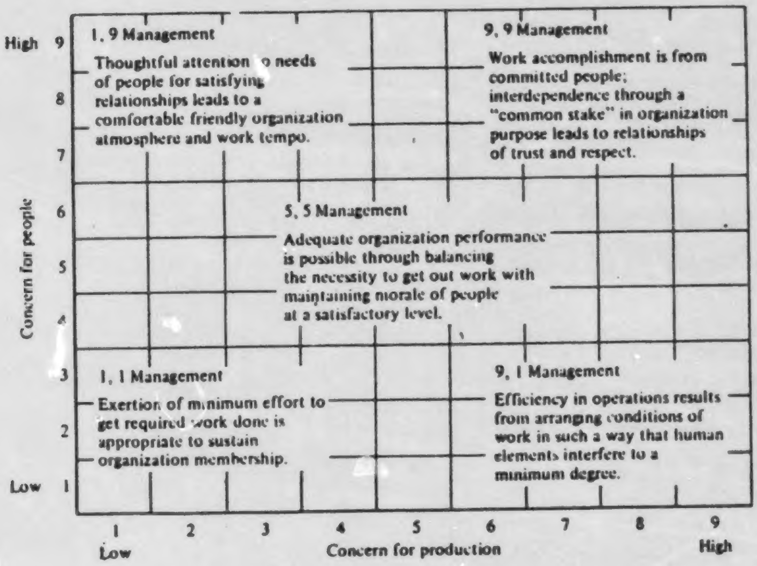
1. The sensitivity session develops the individual manager, but does not change the organization (Fiedler, 1972; House, 1968)
2. Transfer of skills back to the home setting is often weak, especially if stranger groups are used (House, 1969).

At best, there is contradictory evidence as to its effectiveness in management development. Research results showing positive findings are described in Buchanan (1965) and Argyris (1968); mixed findings are described in Miles (1965) and Gottschalk and Pattison (1969); and negative findings in Dunnette and Campbell (1968) and House (1969).

Lennung and Ahlberg (1975) reported on the results of a Swedish field experiment on the effects of laboratory training as a management training technique. Their findings indicated that individually different changes in the areas of awareness, attitudes and interpersonal competence are to be expected after training, in contrast with changes in central tendency claimed by proponents of this style of training. Central tendency changes can be expected after laboratory training in four instances: (1) when the goal of the research is to measure "meta-learnings" (learning how to learn); (2) when all kinds of changes, regardless of direction, are registered; (3) when the researcher records an increased competence in a certain subject matter or skill as a change; and (4) when all people are considered extreme at the outset and therefore must move in one direction or the other. Lennung and Ahlberg do not believe that these conditions contradict their overall findings.

Grid OD

Grid OD is an outgrowth of the managerial grid approach to leadership styles developed by Blake and Mouton (1964). The grid identifies five basic styles of management, as illustrated in Figure 8. The range of styles extends from the 1,1 manager who has minimal concern for people and production, to the 9,9 manager who has maximum concern for these factors, and from the 9,1 manager concerned primarily with production to the 1,9 manager concerned primarily with people. Blake and Mouton emphasized that while intuitively a 9,9 manager appears to represent the ideal situation, in practice the "best style" is dependent on the situation. Reddin (1970) confirmed this statement, asserting that each of the four styles can be effective or ineffective depending on the situation.



1, 9 Management
Thoughtful attention to needs of people for satisfying relationships leads to a comfortable friendly organization atmosphere and work tempo.
9, 9 Management
Work accomplishment is from committed people; interdependence through a "common stake" in organization purpose leads to relationships of trust and respect.
5, 5 Management
Adequate organization performance is possible through balancing the necessity to get out work with maintaining morale of people at a satisfactory level.
1, 1 Management
Exertion of minimum effort to get required work done is appropriate to sustain organization membership.
9, 1 Management
Efficiency in operations results from arranging conditions of work in such a way that human elements interfere to a minimum degree.
High
Low
Concern for people
1
2
3
4
5
6
7
8
9
Low
Concern for production
High

FIGURE 8. THE MANAGERIAL GRID
(from Blake and Mouton, 1966)

The Grid approach to OD is a long-term process, usually requiring three to five years to implement. It generally follows six phases:

1. Laboratory-seminar training. The purpose of this first phase is to introduce the participants to the overall concepts and materials used in grid training. The seminars that are held are not like therapeutic sensitivity training. There is more structure and concentration on leadership styles than on developing self- and group insights.
2. Team development. This is an extension of the first phase. Members of the same department are brought together to chart how they are going to attain a 9,9 position on the grid. In this stage, what was learned in the orientation stage is applied to the actual organizational situation.
3. Intergroup development. Whereas the first two phases are aimed at managerial development, this phase marks the beginning of overall organization development. There is a shift from the micro level of individual and group development to a macro level of group-to-group organization development. Conflict situations between groups are identified and analyzed.
4. Organizational goal setting. In the manner of management by objectives, in this phase the participants contribute to and agree upon the important goals for the organization. A sense of commitment and self-control is instilled in participants.
5. Goal attainment. In this phase the participants attempt to accomplish the goals which they set in the fourth phase. As in the first phase, the participants get together, but this time they discuss major organizational issues and the stakes are for real.
6. Stabilization. In this final phase, support is marshaled for changes suggested earlier and an evaluation of the overall program is conducted.

Research on the effectiveness of Grid OD in management training and development indicates mixed results. Blake and Mouton et al. demonstrated positive results in a number of instances. Results of a 1964 study led the researchers to conclude that "this type of educational strategy can help to make significant contributions to organizational effectiveness" (Blake and Mouton, 1966). Similarly, in a later study, Blake et al. (1969) summarized their findings as indicating advantages made in (1) dollar savings, (2) increased cooperation, (3) decreased shut down time, and (4) greater personal interest and involvement in the work.

Criticisms of Grid training focus on the nonrigorous methodology employed in its evaluation. Huse (1975), in a review of relevant research on grid training, concluded that most programs are either not evaluated at all or are totally dependent on testimonial or anecdotal data, often with contradictory results.

Despite the questionable research, Grid OD seems to be one of the most widely used OD/management development techniques. According to Huse, in 1973, Blake & Mouton's Scientific Methods, Inc. listed 5 executive grid seminars; 54 managerial grid seminars in the U.S., Mexico, Great Britain, Germany and Japan, 11 managerial grid instructor seminars in three different countries; 6 grid OD seminars; and 29 sales grid seminars in various parts of the world.

Management by Objectives

Management by Objectives (MBO) is both an organizational and management development technique, though its emphasis is on the latter. Historically, MBO has two roots. Organizationally-oriented MBO was originally developed by Drucker (1954) and brought to greater quantitative sophistication by Odiorne (1965, 1979) and his followers. Management-oriented MBO began with McGregor (1957) and Likert (1961) who focused on the more qualitative aspects of MBO in growth and development. McGregor proposed that by emphasizing mutual understanding between superiors and subordinates and job performance, the manager would act not as a judge, but as a facilitator to effective performance.

Very briefly, an MBO program follows three basic steps, as follows:

1. The manager and subordinate determine the subordinate's specific areas of responsibility for the end results desired.
2. The manager and subordinate agree on the standard of performance for each area of responsibility.
3. The manager and subordinate agree on a work plan for achieving the desired results in each area of responsibility, in accordance with the overall objectives of the company.

The goal of this process is two-fold: (1) increased managerial effectiveness and (2) enhanced organizational performance.

Research results are overwhelmingly supportive of MBO programs, if properly designed and implemented. A review of these studies is presented in Chapter 6 of this report.

Negative results have emerged from MBO programs which were improperly implemented. For example, Levinson (1970) showed that a program based on a power-backed reward-punishment psychology can be psychologically damaging to the employees and ineffective for the organization. Similar dysfunctional consequences can result where there is an overuse of tangible measurements (Ridgeway, 1956).

Fiedler, Chemers and Mahar (1976) have developed a contingency model of training based on the Contingency Model (Fiedler, 1967). The theoretical basis for this model postulates that leadership effectiveness is contingent on the appropriate match between motivational structure and situational control. This model stands in opposition to those models which propose a "best" leadership style (Blake and Mouton, 1964; McGregor, 1967) or a modification of leader personality (Argyris, 1976). Fiedler's Contingency Model instead suggests that it would be more effective for the leader to change his immediate situation rather than his personality or motivational structure.

Many commentaries have been written on the Contingency Model of leadership (see Fiedler et al., 1976; Fiedler and Mahar, 1979), both critical and supportive. Fiedler believes, however, that evidence is overwhelmingly in favor of this model as a viable basis for leadership training and development. Reporting on the results of a major research effort involving twelve studies testing the effectiveness of LEADER MATCH, a self-paced, programmed training method, Fiedler et al. (1976) demonstrated the effectiveness of his approach. The studies were conducted in both military and civilian settings, and compared performance evaluations of 423 trained leaders with 484 "untrained" (control) leaders. All twelve studies yielded statistically significant results supporting LEADER MATCH training.

Feedback and Organizational Change

Intrinsically related to the change process in organizations is the notion of feedback. Research on interventions such as MBO and job enrichment has demonstrated the need for employees to know how they are doing on the job (Cook, 1968; Fisher, 1979; Hackman and Oldham, 1976; Tosi and Carroll, 1970). Two orientations have been adopted in this research: (1) social-psychological, in which feedback is viewed as an essential feature of the interpersonal interactions necessary for role learning (e.g., Katz and Kahn, 1976; Meyer, Kay and French, 1965) and as a means of providing the necessary environment for meeting higher-order needs (e.g., Hackman and Oldham, 1975, 1976); and (2) behavioral, in which feedback is related to a given response with little concern for the psychological processes initiated by the feedback (e.g., Hammond and Summers, 1972; Kantowitz, 1974). The social-psychological approach is characteristic of the research on feedback in an organizational setting.

In a major review of the feedback literature, Ilgen, Fisher and Taylor (1979) pointed out several factors which contribute to a lack of generalizations in the literature on the effect of feedback on the behavior of individuals in the organization. Briefly, they are:

1. A tendency to confound the notion of feedback by including in it information-conveying processes which are not synonymous with feedback.
2. A lack of well-developed theoretical statements relating specific characteristics of the feedback stimulus to psychological processes preceding the behavioral response in organizational settings.

3. A lack of communication between or integration of the human performance and motivational orientations to feedback (note: exceptions include Locke, 1968).

Several research needs are indicated:

1. Further investigation into the area of perceptions of feedback. If it is to affect behavior, feedback (especially negative) must be accurately perceived. Several factors seem to affect the accuracy of the recipient's perception:

    - *Source of Feedback*--Research is needed on the characteristics of sources (e.g., credibility, power) as they affect the accuracy of perceptions (Greller and Herold, 1975; Kanifer, Karoly, and Newman, 1974).

    - *Frequency of Feedback*--Research is needed on the effect of the frequency of feedback on perceived control and intrinsic motivation.

    - *Goal-Feedback Relationship*--Research is needed to clarify the nature of this relationship (Locke,1968).

    - *Interpersonal Sources of Feedback*--Research is needed to understand better *how* feedback is given by individuals, especially in light of the apparent tendency of supervisors to distort negative (unpleasant) feedback (Fisher, 1979).

4. FACTOR IV: MANAGEMENT AUTHORITY/COMPLIANCE CHARACTERISTICS

The Management Authority/Compliance Characteristics factor reflects the dimensions of influence and power as components in the superior/subordinate organizational scheme where compliance is required, for example, from subordinates relative to their position or level in the organizational chain. The variables reflect status or hierarchical leveling, attributes found in most organizations normally associated with management control procedures.

As a factor in organizational systems, management authority/compliance characteristics represent the individual management control dimension in organizations. The factor was operationally defined by the concepts of influence, power, conflict, hierarchy, interaction, authority, and role.

The term influence is defined as an exchange process in which one party has the ability to affect, or induce behaviors in, the other. Power also includes the interpersonal exchange relationship in which one party has the ability to induce acceptance of direction by another, but further encompasses the dimensions of coercion and/or dominance. Conflict is defined as mutual opposition between competing, contradictory, or inconsistent impulses, tendencies, or values and includes the concepts of confrontation and competition. The term hierarchy, as used in this factor, refers to the arrangement of the components of a system in a higher-lower, or superordinate-subordinate, relationship. Interaction is defined as mutually effective action involving two or more systems of the same or of different orders and includes the concepts of cooperation, coordination, human relations, and participation. The concept of authority is defined as an exchange relationship between parties (managers and subordinates) in which legitimated power (i.e., that which coincides with values of those involved) is exerted. Role is defined as a function (formal or informal) assumed by an element (manager) of the system and includes the concept of relationship.

From a behavioral research and general systems theory perspective, the management authority/compliance factor reflects those behaviors and responses to behavior that occur in organizational systems relative to "managing" and influencing components of the system so that management objectives are achieved. The literature related to this factor, in many cases, deals with the interplay between influence and power, between hierarchy and authority, and the management roles played in the area of conflict and conflict resolution. The underlying concern in this factor is the identification of those management behaviors and individual arrangements existing in an organization that make it work, i.e., the key ingredients and associated behaviors that manage organizational systems.

A. THEORETICAL BACKGROUND

Much of the theoretical literature of the last two decades has advocated a contingency approach relative to the management authority/compliance dimension. The underlying assumption is that inflexible modes of managing organizations are not consistent with current understanding and organizational realities. The contingency approach would argue that organizational systems are faced with a variety of situations and, therefore, a body of concrete rules cannot always be validly applied in each situation. Kast and Rosenzweig (1973) suggest that the contingency view:

> "...emphasizes the multivariate nature of organizations and attempts to understand how organizations operate under varying conditions and in specific circumstances. Contingency views are ultimately directed toward suggesting organizational designs and managerial practices most appropriate for specific situations."

Luthans and Stewart (1977) in response to this view, to the recognition of situational influences on the management of complex organizations, and to the lack of a comprehensive and integrative theoretical framework for contingency management, introduced a General Contingency Theory (GCT) of Management as an overall framework to integrate the diverse process, quantitative and behavioral approaches to the management dimension, to incorporate environmental components, and to bridge the gap between management theory and practice.

The General Contingency model of the organization is, according to Luthans and Stewart, a systems paradigm with three primary levels of organizational "building blocks." The primary system variables include environmental variables, resource variables and management variables; the secondary system variables include organizational variables and performance criteria variables; and the tertiary system variables include the system performance variables.

From a generic perspective, the management authority dimension consists of an integrative level of responsibility between the technical and institutional levels of responsibility (Parsons, 1960, Chapter 1). The manager serves as a translator of the general organizational system goals so that the technical level of responsibility can be directed to convert raw materials into products or outputs. The manager, according to this view, must be able to combine authority, power, and influence in making the organization work effectively. Along the way, conflict occurs, and the manager assumes roles in the hierarchy to achieve resolution of the problems. The theoretical literature which follows reflects these components.

Authority

Scott, Bornbusch et al. (1967) present a conception of authority and authority systems, as well as a theory predicting the instability of certain kinds of authority systems. Authority systems in formal organizations were analyzed in terms of the process by which the performance of organizational participants is evaluated. The authors proposed that authority be viewed as authorization to attempt to control the behavior of others, and that it rests in four different kinds of authority rights, each of which is a component of the evaluation process. The authors defined authority systems in terms of the distribution of these rights among participants. The theory proposed specifies certain problems in the evaluation process which make the authority system incompatible with participants' achievement of evaluations acceptable to them. Incompatible authority systems were postulated to be unstable and to remain so until the incompatibility is resolved. A set of indices was developed for the identification of unstable systems, including: dissatisfaction with parts of or the whole system, communication to others in the system about the dissatisfaction, suggesting to others that the system can be changed, and noncompliance with the exercise of any authority because of the dissatisfaction. From a managerial perspective, those with this level of responsibility must be aware of the problems of incompatibility in authority systems relative to subordinate evaluations and the power to influence subordinates regarding achievement of management or organizational objectives.

Power

A concept directly related to authority is power, which here describes management behavior directed primarily at developing or using relationships in which subordinates are to some degree willing to defer to other's wishes. Kotter (1978) argued that the importance of power-oriented behavior to managerial career success varies depending on factors that define the managerial jobs involved. The major defining factor is job-related dependence, which is in turn determined by organization size, environmental uncertainty, environmental dependencies, organizational goals, technology, formal structure, measurement systems, and reward systems.

According to Kotter, the relationship between power-oriented behavior and organizational effectiveness depends on at least three intervening variables: job-related dependence, managerial goals and values, and top management behavior. Accordingly, a technique called PDA (power/dependence analysis) is suggested as a means of identifying and mapping out the dependence inherent in a managerial job and the way the incumbent generates and uses power to cope with that dependence. It permits identification of what job dependencies should be and what kind of power-oriented behavior is needed from the point of view of organizational effectiveness. Salancik and Pfeffer (1977) distinguish between different kinds of power behavior and theorize that traditional political power, far from being a "dirty business" is, in its most basic form, one of the few mechanisms available for aligning an organization with its own centralized reality. Institutionalized forms of power--authority, legitimization, centralized control, regulations--tend instead to buffer the organization from reality and obscure the demands of the environment. Political processes, rather than being mechanisms for unfair and unjust allocations and appointments, tend toward the realistic resolution of conflicts among interests. And power, while it eludes definition, can be recognized by its consequences--the ability of those who possess it to bring about the outcomes they desire.

This model of power is an elaboration of what has been called strategic-contingency theory, a view that sees power as something that accrues to organizational subunits (i.e., managers, individuals, and departments) to cope with critical organizational problems. Power is used by subunits to enhance their own survival through control of scarce critical resources. Because of the processes by which power develops and is used, organizations become both more aligned and more misaligned with their environment. From the management authority perspective this contradiction calls for an effective analysis on the part of organizational systems managers relative to maintaining a critical balance between alignment and misalignment.

Grimes (1978), on the other hand, viewed the concept of power in relation to authority and leadership in an organization. According to Grimes, power is conceptualized as influence and social control, the former reducing and latter reinforcing authority. Authority and power are viewed in this framework as end points on a single continuum. From a management perspective, what legitimizes authority is the promotion or pursuit of collective goals associated with group consensus. The polar opposite, power, is pursuit of individual or particularistic goals associated with group compliance. In terms of influence and social control, the two concepts are the inverse of each other: authorities are the initiators of social control and the recipients of influence; partisans, the initiators of influence and the target of social control. This conceptualization of power would suggest a management role which uses "authority" in the case where subordinate compliance leads to collective achievement of system objectives, on the one hand, and the use of "power" for the achievement of individual manager goals, on the other hand.

Dependency in an organizational system is the obverse of power. According to Emerson (1962), power is operationally defined as a proportionate function of (a) the capability of an individual (manager) or unit to meet the requirements or needs of other individuals and/or units and (b) the relative effectiveness of maintaining this ability in competition with other power seeking units. Hickson et al. (1971) suggested that dependency is related to three conditions: (1) the amount of "coping with uncertainty" that a unit (division) or group does for other units or groups within the organization; (2) the degree of substitutability of the coping mechanisms which really means "how many alternatives are available?"; and (3) the unit's location relative to "centrality" or its interconnections with other groups in the system. From a management authority perspective this theorizing seems to focus on the importance of recognizing one's visibility and position dependency relative to other units within the organization.

Hrebiniak (1978) presented a model of power which views the concept in the context of the organization. Although this model approaches the concept of power from an organizational systems perspective, it also summarizes the individual dimensions of power relative to management authority and compliance characteristics. Figure 9 depicts this model of power.

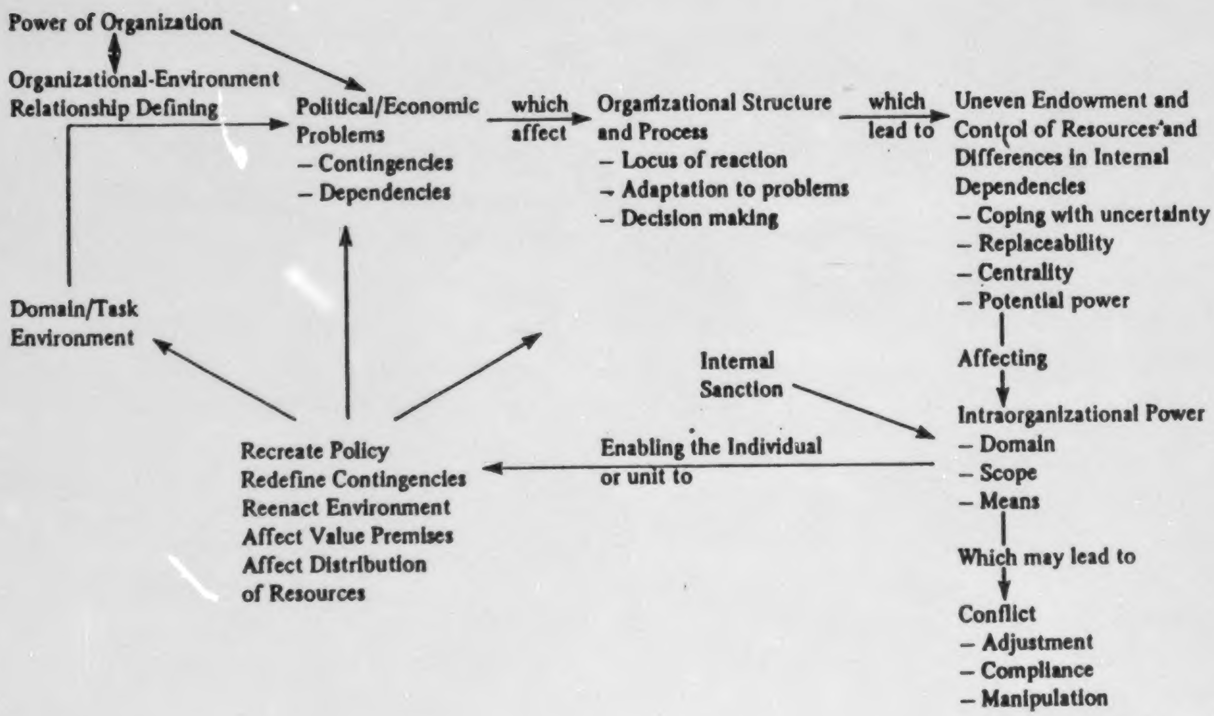


FIGURE 9. MODEL OF POWER

(from Hrebiniak, 1978)

In terms of the management authority factors, this model suggests that individual power--i.e., management power to influence and obtain compliance--is a function of a number of interrelated organizational systems variables. These components include environmental influences, the domain staked out by the organization for its product, the task environment which is related to goal setting and attainment and political/economic problems. These components feed into organizational structure and, in turn, determine the differential control of resources and dependencies leading, finally, to the individual power brokers (managers) and their activities associated with using power to make the organization work effectively. Hrebiniak (1978) concluded that:

> "The effects of power are widespread. Individuals or units with power are in a position to affect organizational strategy, influence future action, and even redefine the task environment... Power provides an opportunity to create, change, or otherwise affect organizational policy and goals. The greater the power, the greater the ability to do so."

In accordance with the Hrebiniak model, power is a relational component in both the management authority factor and the organizational coordination and control factor. From the management perspective, power reflects an interactive relationship in which a manager, for example, has the ability to guide the behavior and attitudes of the subordinate. This view defines power as influence and authority as a formalized, legitimate form of power. Hence, the management authority/compliance dimension. Though power is more appropriately a structural phenomenon, the individual (in the case of this discussion, the manager) plays an important role in defining and using power to make an organization work effectively.

Role

The general literature on role is extensive; but, relative to the concept of management authority and/or management behavior, there seems to be very little theorizing. By definition (in relation to the management authority factor) a role is a set of expectations subordinates have regarding the behavior of a person in a management position (Jacobson, Charters, and Lieberman, 1951). Hersey and Blanchard (1970) suggested a reevaluation of the role of management, given the cultural changes now affecting organizational structure. The view of a manager's role as one of planning, organizing, motivating and controlling was and may still be appropriate at the organizational levels comprised of unskilled/uneducated workers. However, with the increase in educated, highly skilled workers, this role has become too restrictive. The "Linking Pin" concept developed by Likert may be an alternative model of managerial behavior. Freed from the demands of constant control and supervision, the manager should now turn his attention from his role as supervisor to that of subordinate at the next higher level of organizational hierarchy. Increased awareness of the cultural changes by management could make organizational structures and management behavior more relevant to workers, thereby maximizing their productivity.

Despite this theoretical "Linking Pin" conceptualization, the manager is faced with a number of different perceived roles on the part of subordinates. There are several ways that a manager can respond to often times conflicting perceived role expectations. According to Toby (1952): (1) The manager can place his responses in a hierarchy of role obligation where those role expectations from the level of superiors become more important than expectations from subordinates. (2) The manager may use screening devices, which mean that when unpleasant management actions are done relative to subordinates, the boss can blame the new rule on upper management. (3) The manager can use rituals such as forms of politeness or hierarchical status to reduce role expectations from subordinates. This makes it more difficult for the subordinate to expect anything from the manager on the basis of friendship. (4) The manager may put things off relative to subordinate role expectations to allow the need for action to dissipate as a function of time. (5) The manager may lead a double life in which different roles can be played with different subordinate groups where these groups have little contact with each other. There may be other ways in which the manager can respond to expected role behavior, but these few seem to highlight the problems often associated with role expectations, role conflict, and role ambiguity.

Changes in organizational structure within a system have been found to create necessary changes in managerial role behaviors. Lawrence (1958) studied the changes which occurred in management role behavior in a supermarket organization as a function of moving from a centralized to a decentralized mode of operation.* The results of this change, according to Lawrence, called for a "formal role" definition for managers at various levels within the organization. The formal role, then, includes specific descriptions of duties, descriptions of actions, interactions, and attitudes or sentiments required of the formal role. Because of changes in structure, then, roles become more formalized and operationally defined in terms of activities, interactions, and personal attitudes or sentiments (Lawrence, 1958).

---

* See Chapter 5 for a more thorough review of literature reflecting structural issues such as centralization vs. decentralization.

Conflict

An outcome of role ambiguity and role responses such as those outlined above often includes conflict and the requirement for conflict resolution.

Pondy (1967) has provided a discussion of several of the most widely accepted concepts and models of organizational conflict. It has been argued that conflict within an organization can be conceptualized best as a dynamic process underlying a wide variety of organizational behaviors. According to Pondy, the term "conflict" refers neither to its antecedent conditions, nor individual awareness of it, nor certain affective states, nor its over manifestations, nor its residues of feelings or structure, but to all of these taken together as a history of a conflict episode. An organization's success hinges to a great extent on its ability to set up and operate appropriate mechanisms for dealing with a variety of conflict episodes.

Conflict has many sources, possible modes of regulation, and effects on the organization. Thus, to be useful in the analysis of real situations, Pondy argued, a general theoretical framework for the study of organizational conflict must at least fit several broad classes of conflict, some or all of which may occur within the same organization. This suggests that different ways of abstracting or conceptualizing a given organization is required depending on the phenomena to be studied. Three models of the organization are described which serve as the basis for a general theory of conflict. They are: (1) a bargaining model, which deals with interest groups in competition for resources; (2) a bureaucratic model, which deals with authority relations and the need to control; and (3) a systems model, which deals with functional relations and the need to cooperate.

Thomas (1976) observed that a balanced view of conflict is emerging in the literature which recognizes that conflict can have constructive or destructive effects, depending on its management. To aid in conflict management, Thomas presented two general models of conflict synthesized from the literature--a process model and a structural model. The process model focuses on the sequence of events within a conflict episode and is intended to be of use when intervening directly into the stream of events of an ongoing episode. The structural model focuses upon the conditions which shape conflict behavior in a relationship and is intended to help in restructuring a situation to facilitate various behavior patterns.

Bonoma (1976) placed the concept of conflict into a "power systems" framework because the variables of power, conflict, cooperation and trust have traditionally been explored in a context-irrelevant fashion as general theoretical explanations for many social phenomena at the levels of organisms, groups, organizations, societies, and even supranational systems. Bonoma questioned the assumed high cross-system applicability of these concepts by outlining three different prototypical power systems which seem to find frequent expression in everyday life: (1) the unilateral power system, in which a strong source imposes influence on a weak target; (2) the mixed power system, in which partially equivalent interactants bargain to agreement or deadlock; and (3) the bilateral power system, in which interactants are in unit relation and formulate joining policy programs. Power, conflict, cooperation and trust are all found to require substantially different definition and treatment when considered in one as opposed to another of these prototypical systems. Bonoma therefore recommended a context sensitive approach to conflict research in which concepts are articulated with specific regard for the interactional system in which they will be applied.

A majority of the theoretical literature seems to focus on identifying models which tie the concepts of power, influence and authority together as they relate to management behavior. The models presented in this review seem to suggest that the management authority/compliance factor is operationalized in terms of the concept of using power in an organization to make the system work effectively. Power is a function of the ability to create a need for this kind of managerial behavior and the ability to maintain this need for power behavior in your unit as opposed to other power seeking units. Power is manifested by managerial authority and influence. Power begets conflict, which calls for a variety of prescribed management role responses to the expectations of subordinates in the system.

Systems Concepts and Management Authority

An organizational system could be defined as an orderly grouping of separate but interdependent components for the purpose of attaining some predetermined objective. Three important aspects of systems are implied here which seem to have a direct bearing on the management authority dimension:

- The arrangement of components must be orderly and hierarchical, no matter how complex it is.
- Since the components of the system are interdependent, there must be communication between them.
- Since a system is oriented toward an objective, any interaction among the components must be designed to achieve that objective.

The management authority factor identified a hierarchical component which was indirectly associated with power, authority, and influence, all of which require interaction or communication among components. A basic component in systems thinking is that of hierarchical relations between systems. From a managerial perspective this suggests an understanding which develops within individuals who play the management role that the organizational system is comprised of other individual subsystems ordered along some scaler chain with some superior and some subordinate persons relative to that individual manager. Further, systems managers are cognizant of the workings of power, influence, and authority in the systems as these dimensions affect both management and labor.

If we view organizations as behavioral systems then we are forced to view the management authority/compliance factor as an interdependent part of a larger concept called organization. The theory and research has shown some interdependence and/or interaction among variables. As one moves from primary structural variables such as those depicted in the organizational coordination and control factor (i.e., to the structural components such as size, degree of centralization/decentralization, and independence/interdependence), a general systems perspective would suggest that forces are created which call for the individual management authority/compliance dimensions to offset uncontrolled growth, dispersion of organizational components and resources, and total independence or autonomy of organizational subsystems. Hence, the requirement for the use of management power, authority, and influence; or, in a sense, the utilization of negative entropy to control and manage the growth of systems. From a general systems perspective, then, lack of management authority and compliance is tantamount to the random dispersion of system elements characterized by the systems concept of entropy; i.e., open systems, if left unchecked, will naturally move to random distribution of their parts. If these management authority components are poorly designed, (i.e., leadership, power, authority, and influence are ineffectively used by ill-prepared management personnel), or when conflict among organizational subsystems is not creatively resolved, then the primary structural elements of the organization will be allowed to continue uncontrolled to the behavioral detriment of those associated with that system.

B. RESEARCH

The research related to the management authority factor and its specific components includes a variety of laboratory and applied field studies. The field research has been conducted in both industrial and military organizations. This section will selectively focus on studies which deal with the concepts of hierarchy, power, authority, influence, role, and conflict.

Hierarchy

Ouchi (1978) addressed the problem of control loss found in hierarchies. The underlying contention was that all forms of control may not be equally susceptible to hierarchical loss. Since organizations achieve five and more levels of hierarchy, Ouchi suggested that there must be some forms of control which can operate through multiple levels. The hypothesis tested in this study was that control based on outputs is relatively less susceptible to hierarchical attenuation than is control based on behavior.

Data were gathered on 215 departments (aggregated from 2,363 questionnaires) of retail department stores in the Midwest. The principal measures were of behavior control given, behavior control received, output control given, and output control received. Four separate questionnaires were used to measure each of these factors. Zero-order correlation coefficients were computed among these variables to test their relationship. The findings indicated that behavior control and output control differ sharply in transmission. Behavior control showed almost no interlevel consistency while output control was transmitted through three levels of hierarchy with relatively little loss. Further analysis suggested that behavior control was determined by local, particularistic conditions and therefore cannot be expected to show high interlevel consistency or transmission.

Jaog and Vroom (1977) investigated the relationship between the hierarchical level of managerial personnel and individual differences in their leadership styles, specifically the degree to which they are disposed to use participative, as opposed to autocratic, decision making strategies. Data were collected from four consecutive levels in the organization: technical professionals (N=134), supervisors with managerial responsibility (N=105), section heads (N=72), and division heads (N=43).

Analysis of self-report data collected from these managers suggested a greater propensity for use of participative methods at higher organizational levels. Subordinate descriptions of their immediate superiors further supported this relationship. However, members asked to describe this relationship revealed perceptions incongruent with the direction of effect implied by the between-level group differences.

Reimann (1974) studied the concept of hierarchical control as one measure of structure. The relationship between the underlying dimensions of structure and organizational performance were examined. Two questions in particular were explored: (1) What differences, if any, exist between the structural dimensions of relatively high and low performing organizations? and (2) If different from those of low performing organizations, what are the dimensions associated with the relatively high performing organizations?

The sample for this study consisted of 29 industrial organizations manufacturing a wide variety of products. Data were gathered from personal interviews with from four to ten top executives in each firm and by consulting relevant corporate documents. Two measures of effectiveness were used: subjective (financial and non-financial) and objective (executive turnover). Eleven measures of structure were used: functional specialization, formalization, lack of autonomy, delegation, centralization, functional dispersion, hierarchical control, functional specificity, staff density, administrative density, and vertical span. Cluster analysis of the correlations among the eleven measures of structure isolated three relatively independent dimensions--(a) decentralization, (b) specialization, and (c) formalization--among the ten high performing firms but failed to produce any such independent measures among the low performing firms. While the relatively high effective organizations can be described by a multidimensional framework along the lines of that proposed by the Aston group, the relatively low performing organizations tend to conform more closely to the Weberian, unidimensional conception. The findings also indicated that the organizational patterns of high performing firms were of independently varying degrees of decentralization, specialization and formalization. These independent dimensions may be considered as forming a three-dimensional structure space. Reimann concluded that one of the reasons for the differences in conclusions drawn by various researchers regarding the dimensionality of the organizational structure space may be their failure to analyze the relationship between an organization's structural arrangements and its performance. As indicated by the results, hierarchical control did not cluster.

Davis (1953) found that a person's position in the hierarchy of an organizational system was related to communication and interaction activities in the organization. Management and/or executive level personnel (i.e., people higher in the scaler chain) tended to communicate more or spend more time in communication transactions than personnel at the foreman level. The study also found that personnel higher in the hierarchy had more information than those at lower levels in the organizational hierarchy.

There are other effects associated with hierarchy which have relevance to the management authority dimension. Lawler, Porter, and Tannenbaum (1968) found that managers tend to have more favorable evaluations of contacts with superiors than with subordinates. This might be expected because of higher status accorded superiors; however, Lawler et al. concluded it may also be because the managers have fewer contacts with superiors, and it is therefore regarded as an "unusual" event. Additionally, Hurwitz, Zander, and Hymovitch (1968) suggested that this phenomenon may happen because the superior has reward power over the subordinate, thereby making any interactions a more important event for the subordinate. Hare (1953) found that superiors tend to underevaluate communications exchanges with their subordinates and therefore miss the significance of an exchange until it is too late. From a managerial perspective, an awareness of hierarchical levels becomes important relative to interactions at the superior-to-subordinate and subordinate-to-superior levels.

Power

The study of power relative to the management authority/compliance dimension has advanced a great deal. However, much of the research in this area has been more theoretically than empirically based. Much of the research has treated power as an independent or causal factor. It is assumed that people with bases of power, because of their expertise of position, influence others and affect decision making processes in an organizational system (French and Raven, 1959).

Pruden and Reese (1972) examined the relationships between external and internal power of boundary personnel relative to effective performance. Pruden and Reese studied a sample of 91 outside salesmen selling a line of building materials to a variety of customer types. The results indicated that performance was related to the salesman's "identification" with the customer, i.e., a perceived similarity between the customer and the salesman. Pruden and Reese argued that the effective performers are those who have power in a number of areas including having greater authority over inside salesmen and having procedures to protect their familiarity with customers. The successful salesman has the power to control such things as delivery time, price, and credit.

Power has also been found to have a relationship to settling conflict when that power is exercised by a chief executive. Stagner (1970) found the power of a chief executive to be one of the strongest and widely acknowledged variables relative to resolving conflicts. Executives, when a conflict reached certain proportions, would bring the issue to their boss (the chief executive) for resolution.

Dieterly and Schneider (1974) examined the effect of organizational environment on perceptions of power and organizational climate. Subject perceptions of their own power and organizational climate were investigated as a function of three characteristics of the organization work environment. The dimensions of power used as dependent variables in this study were: referent power, expert power, legitimate power, coercive power, and reward power. The four aspects of climate used as dependent variables included: individual autonomy, position structure, reward orientation, and consideration and support. The independent variable, work environment, was divided into three aspects: level of formal position, degree of participation in decision making, and philosophy of the organization toward customers. The 2 x 2 x 3 (level of participation, stockholder or customer orientation, and position level, respectively) design (N=20) was carried out in a laboratory setting.

The results indicate that climate and power perceptions were not strongly related to each other. Level of participation appeared to be the main contributor to self-perceived power both as a main effect and in interaction with stockholder/customer orientation and position level. Stockholder/customer orientation was the main contributor to climate perceptions, generally in interaction with one of the other environmental variables but also as a main effect. Participative decision making results in decreased self-perceived power for occupants of higher positions. A customer orientation combined with participative decision making leads to positive climate perceptions.

Cowsert (1974) conducted a study of organizational environment relative to preferences for leadership and power in the officer corps. This study analyzed the relationship between the endorsement of values judged to characterize the Army organizational environment and the preferences expressed for leadership and power options by officers in supervisory settings. The subjects were 99 active Army majors and lieutenant colonels in a resident Command General Staff College class at Fort Leavenworth. Operational definitions limited leadership to actions designed to gain the willing cooperation of one's subordinates, and power, conversely, to actions that can force the subordinates' compliance in spite of their opposition. The organizational environment was defined in terms of structure, authority, regulations, and leadership training and shown to be typical of closed organizational systems.

A questionnaire was developed that assessed one's preference for leadership or power on one part, and one's endorsement of organizational values on another. The hypothesized negative relationship between preferences for leadership and endorsement of these organizational values was shown to exist. The main conclusions were that few officers realize the military environment may be inhibiting their use of leadership, that the environment does not reward leadership as defined herein and therefore does not encourage its development outside the classroom, and that leadership doctrine is in conflict with the environment.

Nealey (1976) conducted a longitudinal study of leader power in the military. Research activities for this study occurred over a four-year period. The study included two phases. During Phase I, interpersonal influence questionnaires were administered to three samples of enlisted men (N=1596) at three stages of their military careers--new recruits, basic trainees, and enlisted men with two years of duty. The questionnaire probed leadership power and leadership climate dimensions.

Phase II of the study involved the development and administration of an indirect measure of leadership power attitudes based on critical incidents in Navy leadership. One hundred and ten officers and 110 enlisted men served as subjects.

The major conclusions from the total study were that enlisted men report heavy reliance by military superiors on leadership power based on knowledge, experience and mutual respect. The discrepancy between leadership attitudes and actual leadership behavior remains unanswered.

Authority

One of the variables directly related to the concept of power is authority. From a managerial authority perspective Hellriegel and Slocum (1974) in a descriptive study observed four kinds of authority relationships ranging from advisory to command authority. They identified these authority relationships as:

1. "Staff Advice," where managers may seek assistance, for example from personnel in recruiting;
2. "Compulsory Advice," in which the managers seek advice from, for example, personnel, but they need not follow such advice;
3. "Concurring Authority," which requires agreement from both the line manager and a staff person that a certain action must be taken;
4. "Limited Company Authority," which entails line authority and is a form of absolute authority in a designated area.

Bass et al. (1975) examined authority in the context of "management styles" associated with organizational, task, personal, and interpersonal contingencies. Prior studies with subordinates and managers from public and private agencies resulted in the development of a 31-scale Profile questionnaire conceptualized in a systems framework of input, transform, and output variables. In this study, the Profile was completed by 78 managers and 407 of their subordinates. Convergent and concurrent validity studies generally supported the validity of the scales.

Five management style measures were found to be conceptually, but not empirically, independent. The five management styles--direction, negotiation, consultation, participation, and delegation--differentially correlated with organizational, task, intrapersonal and interpersonal variables as well as with measures of work-unit effectiveness and satisfaction. Results of a stepwise regression analysis showed that direction was most likely to appear with structure and clarity, negotiation with short-term objectives and authoritarian subordinates, consultation with long-term objectives and intragroup harmony, participation with clarity and warmth, and delegation with warmth and lack of routine tasks.

Influence

The process of influence in organizational systems has been the subject of numerous theoretical discussions. However, the research relative to influence has been centered in more specific areas such as persuasion and attitude change. Much of the research on influence is more directly associated with the domains of mass influence (one to many) and social influence. Very little research has focused on the process of influence in organizational systems such as the more specifically defined military or industrial contexts.

Spekman (1979) investigated the boundary role person as an influence agent and investigated an aspect of his potential ability to influence the decision outcomes of the organizational members. The sample consisted of 20 firms from the greater Chicago area. The focus of the research was on the purchasing agent and his interaction with members of the buying task group (BTG) (i.e., those constituents responsible for purchasing related decisions). Through questionnaires distributed to the purchasing agents in these firms, two issues were explored: (1) whether the degree of power attributed to the purchasing agent by other BTG members is associated with their level of perceived environmental uncertainty; and (2) the nature of the individual power-related behaviors of boundary role persons (BRPs).

The results of the study indicate that as the boundary role person's information requirements increase under conditions of higher perceived environmental uncertainty, the constituent members attribute to the BRP greater power in the decision making process. The results further suggest that, in light of the BRP's position in the transfer of information across the organization's boundary, the reliance on expert power appears to be the most effective basis of social power for dealing with other organizational members. Though these findings are expressed more in terms of power, the process of influence is also considered from the perspective of an individual's behavior.

Tannenbaum (1968) and associates provide research which extends our understanding of influence processes in organizations. Their research identified a relationship between influence processes and an organization's effectiveness. Tannenbaum illustrated influence processes by means of a graph as depicted in Figure 10. This illustration summarizes the concepts of hierarchy, authority, power, and influence with the horizontal axis reflecting an organization's authority hierarchy including a president or top manager at one end and rank-and-file members at the other end. The vertical axis denotes the amount of actual effective influence occurring at various levels in the hierarchy of the organization.

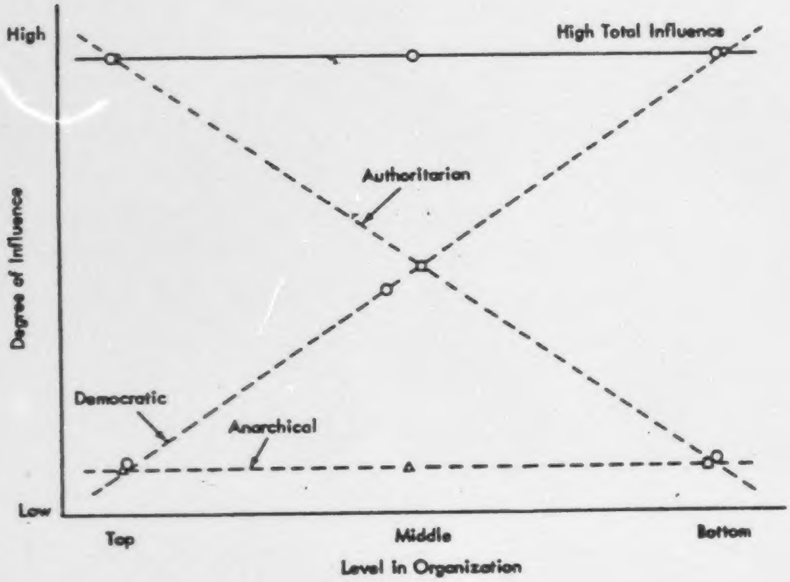


FIGURE 10. INFLUENCE GRAPH
(from Tannenbaum, 1968)

Role

The research related to role and role theory focuses on two major areas: role conflict and role ambiguity. Schuler, Aldag, and Brief (1977) studied the psychometric properties of the role conflict and ambiguity scales, including the factor structure, coefficients of congruency, internal reliabilities, test-retest reliabilities, absolute levels of conflict and ambiguity, and correlations with additional attitudinal and behavioral variables.

The analysis was conducted across six samples. Data were collected from 1,573 employees from four different organizations. For each sample, zero-order correlations between role indices and all other variables were computed. An inter-item correlation matrix was calculated for the six role ambiguity and eight role conflict items. Two factor varimax rotations were obtained for each sample, and factor congruency values were calculated. In addition, internal reliability estimates were computed for each role scale, and test-retest reliabilities were computed for role conflict and ambiguity with the matched respondents in two of the samples. The results suggest that continued use of role conflict and role ambiguity scales appears to be warranted.

Keller (1975) examined the relationship between role conflict, ambiguity, and job satisfaction. Specifically, this research was conducted to test some hypotheses generated from the Kahn, et al. theory of role dynamics and to extend and refine the relationships between role conflict, ambiguity, and job satisfaction by using a multi-dimensional conception of job satisfaction. The basic hypotheses stated that role conflict and ambiguity will be negatively related to dimensions of job satisfaction, while personality-related values will be positively related to role conflict and ambiguity as well as to the dimensions of job satisfaction.

Data were gathered from questionnaires distributed to 51 professional employees of an applied science department in a large government research and development organization. A correlational analysis was conducted between the role conflict and ambiguity scales and the five dimensions of job satisfaction. The results of this study tend to partially support the Kahn, et al. theory of role dynamics. The data indicated that role ambiguity was related to intrinsic sources of job satisfaction, while role conflict was related to extrinsic satisfaction sources. However, the second hypothesis was not supported by this study; values were found to be generally unrelated to role conflict and ambiguity and job satisfaction.

House and Rizzo (1972) examined role conflict and ambiguity as intervening variables in the development and testing of a model of organizational behavior. The dependent variables consisted of measures of perceived organizational effectiveness, employee satisfaction, anxiety, and propensity to leave the organization.

Questionnaires were completed by 9 vice-presidents and 56 quasi-professional and managerial employees selected by the vice-presidents. This measurement gave a characterization of the firm in theoretical terms. Inferences from this characterization were used to construct a model of behavior of the members of the organization. Using this model as a guide, four specific hypotheses were stated: (1) Supportive team-oriented employee-centered supervision and supportive employee-centered organizational practices will be correlated positively with employee satisfaction and negatively with perceptions of organizational problems, anxiety, and propensity to leave. (2) Formal organization practices and task oriented leadership will be negatively correlated with role conflict and role ambiguity. (3) Role conflict and ambiguity will in turn be correlated negatively with perceptions of organizational effectiveness and satisfaction and positively correlated to anxiety and member propensity to leave. (4) The independent variance in the role dimensions will account for a significant amount of the correlations between formalization practices and the dependent variables.

The first three hypotheses were tested using Pearson product-moment correlations, the fourth by comparing the zero-order correlations with their own partial correlations holding each of the role dimensions constant. Findings showed that predictors tended to relate in expected directions to role measures and dependent variables. Role measure hypotheses were generally supported, and role ambiguity was a better predictor and intervening variable than role conflict.

Much of the research in role theory seems to lead in the direction of resolution of role conflict. Bernardin and Alvares (1975) examined conflict resolution strategies as they are related to hierarchy. Specifically, they examined perceptions of forcing, compromise, and confrontation on behavioral strategies of the first-line supervisor in role conflict situations. It is predicted that perceptions of these behaviors will differ as a function of organizational level. This difference could be used to explain the discrepant ratings of first-line supervisory effectiveness from levels above and below him.

One hundred and twenty-nine employees of a large manufacturing company participated in the study. Each subject was given a folder containing four descriptions of conflict situations, each followed by a description of three behavioral strategies for dealing with the conflict. Participants were asked to rate each description on a seven-point scale from extremely ineffective to extremely effective in terms of that particular conflict. Correlational analyses were used to compare the individuals' ratings. The results of this study indicate that perceptions of role conflict resolution strategies are a function of organizational level and conflict type. These findings point out the need to investigate the relationship between important behaviors elicited by a leader and perceptions of those behaviors from positions above and below him. Bernardin and Alvares concluded that rather than studying hypothetical constructs (e.g., consideration and structure) to explain leader behavior, consideration of behaviors in situations characteristic of the samples involved will result in more useful and generalizable information.

From a managerial perspective Pfeffer and Salancik (1975) explored supervisory behavior along the dimensions commonly used in studies of leadership behavior, but with emphasis on the extent to which that behavior is determined by constraints deriving from the supervisor's set of organizational and social interactions. It was argued that the supervisory behavior was constrained by the demands of others in his role set.

Pfeffer and Salancik found that the expectations of a supervisor's superior and those of his subordinates and peers accounted for a significant portion of the observed variation in behaviors across 53 supervisors in the housing division of a large state university. Further, the extent to which supervisors conformed to their superiors' expectations was related to the number of persons and the proportion of the time spent supervising, the demands to produce, the supervisor's sex, and the proportion of the decisions made by superiors. Multivariate analysis indicated that the expectations of subordinates were more important in influencing social behaviors, while the expectations of the superiors were more important in determining work-related behaviors.

Conflict

One of the outcomes of managerial actions and one of the components of the management authority/compliance factor is conflict. Most of the research related to conflict reflects concerns for the identification of conflict resolution strategies, i.e., methods for managers to cope with internal conflict so that the organization can operate more efficiently and effectively. The research recognizes (1) the value of having some conflict within an organization and (2) the need for managerial behaviors which lead to resolving conflict before it leads to the abandonment of organizational system objectives and/or goals.

Stern and Sternthal (1975) developed a laboratory paradigm for examining interorganizational conflict and its management. Sixty-two triads (drawn randomly from 282 business administration students) participated in two experimental groups. One group acted as manufacturer and the other as wholesaler, their goal being agreement on the price and quantity of microscalpels. Conflict was induced by presenting a profit-loss matrix, a bogus distribution of past groups' earnings, and contrived information on complementary skills of group members. Semantic differential responses differed significantly for conflict management (superordinate goal, exchange of persons) and no-conflict management groups, indicating lessening conflict in the former groups. There were no specific differences on in-group/out-group items. Expressive-Malintegrative Behavior Indexes, derived from Bale's Interaction Process Analysis, provided further support for the exchange-of-persons strategy.

Three conclusions were drawn. First, these analyses confirm the previous findings regarding parasimulation as a successful paradigm for generating an interorganizational conflict situation in a controlled setting. Second, the findings for the exchange of persons program were consistent with previous research. In situations in which goal compatability is possible, an exchange or role reversal strategy enables understanding of a counterpart's position, the finding of common ground, and ultimately the reduction of conflict. Finally, the evidence regarding the efficacy of a superordinate goal as a means of conflict management was not compelling. Several modifications in the existing paradigm were suggested to aid future research.

Renwick (1975) investigated interpersonal conflict occurring on the job. The purpose of this study was two-fold: (1) to examine the frequency with which specific topics are perceived as issues of conflict as well as the frequency with which various sources are viewed as the determinants of superior-subordinate conflict; and (2) to investigate the effects of status differences on the management of conflict and attitudes toward disagreement from the perspective of both supervisor and subordinate and within the context of organizational climate.

Members of 36 superior-subordinate dyads representing 10 organizational subunits completed the Employee Conflict Inventory (ECI). An independent sample of 169 employees from the same subunits completed the Profile of Organizational Characteristics used to measure organizational climate. Spearman rank order correlation coefficients were computed for each dyad in a comparison of topics and sources of conflict. A 2 (status) x 5 (method) analysis of variance with method of conflict resolution repeated over subjects was used to investigate the effects of status differences on the management of conflict. The dependent variable was the likelihood that each of the five methods of conflict resolution would be used. Results indicated that dyad members held similar perceptions concerning the topics and sources of superior-subordinate conflict: technical and administrative issues were the most frequent topics, and differences in perception and knowledge were the primary reasons. Although perceptions of the other party's management of conflict were similar to the respondent's description of self, they differed significantly from the other's own self description. Conflict management was related to status differences as well as to attitudes toward conflict and corresponded to response styles predicted to emerge in consultative organizational climates.

Howat and London (1980) investigated attributions of conflict resolution strategies in supervisor-subordinate strategies. Specifically, this study examined the extent to which measures of conflict management and interpersonal relations were attributed to individuals who perceive conflict. Data were collected from one supervisor and one subordinate in 113 park and recreation agencies. Correlations between supervisor's ratings on one variable and subordinates' ratings on another were calculated. Regression analyses were also conducted, treating the ratings of conflict frequency as the independent variable and attributions of conflict management and interpersonal relations as the dependent variable.

The results supported the hypothesis that perceived conflict frequency is associated with attributions of conflict. Supervisors and subordinates who perceived higher conflict frequency tended to be seen by each other as using force, a strategy indicative of conflict intention. Supervisors who perceived higher conflict frequency were viewed by their subordinates as likely to withdraw from conflict, whereas subordinates who perceived higher conflict frequency were viewed by their supervisors as likely to avoid confrontation and compromise. Perceptions of conflict frequency were negatively correlated with ratings of the favorability of interpersonal relations.

5. FACTOR V: ORGANIZATIONAL COORDINATION AND CONTROL

Factor V, Organizational Coordination and Control, reflects both characteristics of organizations associated with structure and concerns leading to the coordination and control of the organizational systems, subsystems, and subsidiaries. The coordination of organizational activities is a function that must be performed continually. Coordination is defined as the process of achieving unity of effort among various subsystems in the accomplishment of goals. Organizations typically establish several different mechanisms for coordination. These mechanisms will be discussed in this chapter.

From an organizational perspective, the system (organization) consists of a number of subsystems, an important one of which involves control. This is the major focus of this chapter. Some degree of control is assumed to be necessary in order to facilitate the flow of organizational inputs, transformation, and outputs.

Coordination and control activities are necessary in every organization. They are utilized in conjunction with planning, coordinating, and motivating activities to form the foundation of the managerial process. The success of coordination and control activities is influenced by a number of variables such as independence, size, centralization, and authority. The concept of independence is defined as a condition of unrelatedness among a set of parts or elements of an organization and is synonymous with autonomy. Size relates to measurements, extents, or ranges of elements or activities within an organization. Centralization pertains to the dominance of an element (i.e. leading part), as well as to the concentration of authority and resources in the operation of a system. Diffusion of authority and resources to a system's elements, however, is referred to as decentralization. This concept is also regarded as the absence of a dominant element or leading part of an organization. Interdependence refers to a condition in which parts of a system are related to other parts such that a change in one affects all others, resulting in change of the total system. Authority within a system involves inter-party exchange relationships in which legitimated power (i.e., that which coincides with values of involved parties) is exerted.

A relationship is speculated to exist between this factor and Factor IV, Management Authority/Compliance Characteristics. A distinction between these factors may be made in terms of level of control, that is, management authority. Factor IV may be described in terms of the individual control dimension in organizations (i.e., manager influence and control of subordinates), while Organizational Coordination and Control, Factor V, can be construed as those structural/organizational features related to coordination and control at the organizational level.

A. THEORETICAL BACKGROUND

Various activities of subunits within organizations must be coordinated and controlled. Some constraints must necessarily be accepted or the alternative is likely to be anarchy. Coordination can be provided by constraints that are external to members of the organization, as suggested by the rational approach to management, whereby rules, plans and hierarchies of authority are imposed on a system to focus its energies on topics considered vital by management. The alternative, the natural or open system, suggests external constraints be minimized, therefore enhancing the system's flexibility and adaptability. The open system advocates that goals and means are most likely pursued when they are established internally through a collaborative and participative process by those most affected.

Deciding whether internal or external control is more efficacious may not be as troublesome as it may first appear. Frequently contradictory schools of thought complement one another when studied at a level of aggregation that permits their integration. A number of authors have attempted to identify an integrative model in this area (Filley and House, 1969; Hellriegel and Slocum, 1974; Kast and Rosenzweig, 1979). Their work, however, resulted in modest findings.

The Process of Control

The process of organizing denotes control. Various uses of control are discussed in the literature on organizations, including (Hrebiniak, 1978):

- Insuring consistency of performance
- Protecting organizational assets
- Measuring, correcting, and rewriting performance
- Regulating quality of output
- Limiting discretion, and developing clear task relationships.

Figure 11 suggests control be seen as a decision-making process, in which the purposes of control are to:

(a) guarantee performance that meets the needs of the organization;

(b) maintain a system of evaluation that fosters creativity and risk taking; and

(c) meet the needs of individuals.

The first purpose of control (item (a) above) is consistent with the concept of preventive and connective control. The latter two, while at first they may appear to be inconsistent to that purpose, are in fact consistent with the notion of control as a decision making process. This will become clearer as the discussion of control is developed in terms of the context or situation in which control exists.

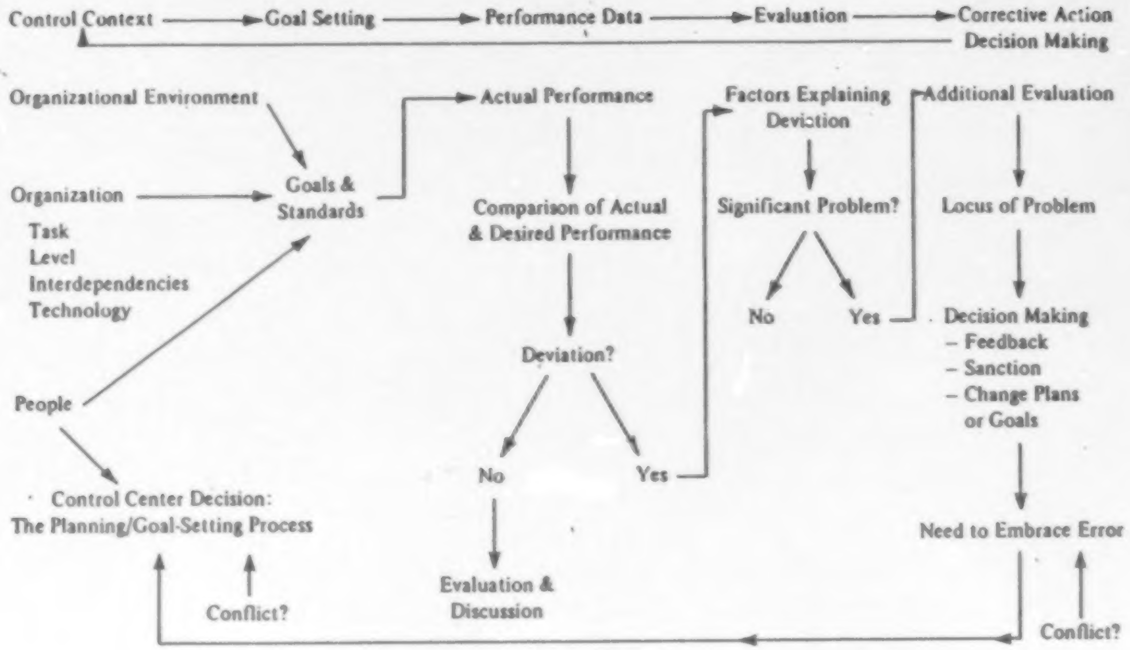


FIGURE 11. DECISION PROCESS OF CONTROL
(from Hrebiniak, 1978)

Organization-Environment Interface

Control is a process of decision making that is affected by many factors. Some of these are shown in Figure 11 above under the context of control. At a macro-level, the relation between organization and environment has implications for control. Control by external forces, for example, is virtually nonexistent if the organization has power or the environment is highly dependent on it. Where the environment has power over the organization, however, there is a high likelihood of its affecting organizational decisions, including those related to control.

The effects of the relationship between organization and environment on control can be developed further. Hrebiniak (1978) suggested that organizational structure and process can be determined by:

(a) Imperatives or causal factors, such as environmental uncertainty, and technology;

(b) Imperatives, plus the interpretation and intervention of decision makers (the human imperative); or

(c) Solely human interpretation and decision.

The effects of environment on organizational control are obvious in the case of (a) and (b). Where an environment is stable, for example, structure is relatively simple. There is an emphasis on hierarchy, consistency of performance, routine and predictable tasks, and rules for adaption. Decision making and goal setting are centralized.

James and Jones (1976) discussed relationships among organizational structures. They mentioned, for example, that a central tenet of open system theory states that the structure of an organization is based on events and that these provide an avenue for studying the interrelationships among dimensions of structure. James and Jones (1976) postulated how, from the perspective of organizational development, events influence structure. Organizations, thus, evolve from primitive systems where individuals interact, because of common needs, through cooperative task behavior (Katz and Kahn, 1966). This evolution continues to a third or final stage where supportive structures for interaction are developed.

The organizational development perspective has received rational and empirical support from Blau (1970) who proposed that increased size generated greater structural differentiation. This led to increased problems regarding coordination and control as a function of increased social fission and complexity. Similarly, Gouldner (1954) viewed increased size and bureaucracy as leading to greater needs for control, resulting in the implementation of general and impersonal rules or formalization. Ghiselli and Siegel (1972) focused on fewer dimensions, with the assumption that tall organizations maximize administrative centralization while flat organizations minimize administrative centralization. Hage (1965) assumed that centralization was highly related to formalization. In addition, specialization has been considered to increase as the complexity (i.e., number of activities) within an organization increases. Increasing the number of events in the open system, therefore, leads to increased division of labor, task specialization, and often elaborated line and staff hierarchies (James and Jones, 1976). It also has been postulated that an organization with many specialists also tended to have more standardized routines, more documentation, and a larger supportive non-workflow hierarchy (Pugh et al., 1968). This was postulated because specialists were presumed to be concerned with introducing procedures and personnel to regulate the activities for which they were responsible.

Organizational Factors, People, and Control

There are other variables that also affect the context of control. Technology, for example, directly affects some of the characteristics of the control process (Reeves and Woodward, 1970). Control may come from a single source (i.e., unitary) or many sources (i.e., fragmented), and it may vary on a continuum from personal to impersonal or mechanical as a function of technology. Control for workers monitoring computers, for example, is unitary and mechanical. Their work behavior is regulated by mechanical forces. Technical criteria direct decisions regarding goals, efficiency, and performance effectiveness.

Individuals in research and development organizations, however, may find control more fragmented. In this situation there is greater reliance on the personal dimensions of control. Professional judgements control work behavior rather than impersonal dimensions of control, such as rules, etc.

Hrebiniak (1974) and Perrow (1967) found that a useful way to consider technology and control is in terms of routineness of problems encountered. Where technology is based on mechanical processes, it follows that:

(a) There are few exceptions or unpredictable events facing the worker; and

(b) The problems that do emerge are highly analyzable.

Hunt (1970) suggested that the control system, therefore, can be geared to set methods of performance and efficiency rather than to problem solving or experimentation.

Where there is little uniformity in the problems encountered, as in the context of a psychiatric setting, a lack of predictability exists. Control, therefore, is geared more to solving new, nonroutine problems than to output and efficiency. The nonroutine system is characterized by a greater likelihood of internal self-control as opposed to the external control of the mechanical system (Hrebiniak, 1978).

Organizational level is another important factor. Institutional level control systems are usually different from those at the technical level. This may be due, at least partially, to differences in technology and tasks. In addition, this may reflect different assumptions about people of varying status, position, and organizational involvement. Institutional-level managers very often have the benefit of direction and ownership which leads to an assumption that they have more at stake and, therefore, are more committed to the organization.

A different assumption can be made about lower-level personnel who are usually seen as requiring tight controls because their level of commitment is too low. An assumption is further made that this lack of involvement leads to minimum performance with an emphasis on ways to "beat the system." These assumptions lead to control systems that are based on distrust and demanding of close supervision.

The type of dependence has implications for control (Thompson, 1967). Pooled interdependence exists when organizational subunits make separate contributions. These subunits are supported by the organization but never formally interact with one another. Units perform a variety of functions necessary to the organization but never need to collaborate on these functions. Interdependence of this type is seen in the case of branch or district sales offices.

Interdependence can be sequential. Under this type, one subunit cannot act before another one does, which cannot act before a third one does, etc. Interaction does occur here, but it is asymmetrical (e.g., on an assembly line).

Reciprocal interdependence occurs when interaction is symmetrical; the outputs of one subunit are the inputs to another. Exchanges between the subunits are normal. Large general hospitals are an example of this type of interdependence.

Coordination and control reflect the different interdependencies (Hrebiniak, 1978). Coordination by standardization, for example under pooled interdependence, involves control by rules or performance programs. An example of this would be two branch offices that rarely interact over task matters but are bound by the same operating procedures established by a central office.

Sequential interdependence (i.e., coordination by plan) involves scheduling to control the flow of work through interdependent subunits. Mass production assembly is an example of this type.

Coordination by mutual adjustment is the transmission of new information during the process of action (Thompson, 1967). The interactions resulting from interdependence, such as in a general hospital, suggest the importance of communication, and the adjustment of subunits to feedback from other units and clients.

Coordination and control by standardization, plan, and mutual adjustment are expensive and problematic. At one extreme, control by rules requires relatively few decisions and little communication subsequent to the initial establishment of the control structure. Control by mutual adjustments, at the other extreme, demands continuous interaction, communication, and decision making regarding the importance of information. There is generally an effort to minimize cost and problems of control within organizations. Therefore, if rules will suffice for control, they will be used. Control processes which are more expensive will typically be avoided for the sake of efficiency and rationality.

Shortsightedness about the real costs of coordination and control is a major pitfall. Standardization and rule use is the least costly approach in terms of time and money; however, the costs of its by-products must also be considered. Standardization presupposes the separation of planning and doing, and rules imply routine and lack of autonomy. These obviously will affect those being controlled. They may result in unintended, but costly consequences such as aberration, tension, turnover, and a general lack of involvement on the job (Argyris, 1973; Hrebiniak and Alutto, 1972).

This impersonal control shortsightedness is not a new insight. Weber (1947) was concerned about the costs and benefits of increased rationality and routine. Control is more complicated than many treatments of it indicate.

Control can be regarded as a dynamic decision making process in organizations. Several purposes can be attributed to control. These include: a guarantee for performance, maintenance of a system of rewards or reinforcements, and satisfaction of individual and organizational needs.

The type of control system depends on the context of control, including organizational as well as personnel factors. A major decision depending on context relates to center of control, for example, external/top-down as opposed to self-control. There are, of course, a variety of costs or benefits related to the two types of control systems, as previously discussed.

Centralization/Decentralization

Assuming structural dimensions of an organization are influenced by both environmental dimensions and contextual dimensions defined and elaborated earlier, and assuming the structural dimensions of organizations are interrelated, a model of centralization's effects on other structural dimensions of organizations may be constructed (Zey-Fenell, 1979):

1. Contextual dimensions: with unstable and nonuniform raw materials, and nonroutine technology, the organization decreases in centralization. As organizational size increases, so does complexity and decentralization. In addition, the organization becomes more dependent on complex external environments as decentralization increases.
2. Structural dimensions: as organizations become more complex, their decision making is decentralized down through the organizational hierarchy. Increased complexity and decentralization is often accompanied by organizational procedures becoming more formalized, and standardized, with work roles, however, becoming less formalized. Increased decentralization and complexity often lead to increased communication.

Zey-Fenell (1979) claims it is safe to assume that the top management of any organization is responsible for the effective and efficient functioning of that organization. When the size and complexity of the organization increase, and the decision making responsibility is on top executives, then top management usually delegates to lower levels those decisions which are less important. This, then, represents the elements of critical decision-making issues, and the capabilities of lower level employees influencing the decentralization process. The more educated the employees, the more pressure to delegate decisions downward. This situation is particularly true when professionals are more knowledgeable than the executive in a certain area. Highly developed technologies may increase this pressure. Pressures to decentralize, therefore, may come with expanded size, and a concommitant increase in differentiation and specialization. Large organizations tend to limit the decision making capabilities of executives and distribute them downward and laterally. The larger the organization, the larger numbers of hierarchical levels, placing administrators in a position to delegate authority. As delegation of authority increases, procedures become standardized, and rules and policies become formalized, therefore ensuring that lower level managers operate within clearly defined limits, and reducing the risk of errors in decisions which top management is ultimately held responsible for. Finally, decentralization increases communication between tangential hierarchical levels, and laterally within levels.

B. RESEARCH

Based on the theoretical perspective discussed above, the focus of this section is on the empirical research in the area of coordination and control. A major area of concern is the direction of power; that is, hierarchy or authority (i.e., vertical power) versus departmental power (i.e., lateral power). This review will also include a brief review of the structural correlates of centralization.

Sources of Power

Tannenbaum and associates (1974) examined six reasons for some individual's ability to exercise control over others. They concluded that such an individual:

1. Has superior knowledge relevant to a task;
2. Can dispense rewards;
3. Can disperse punishment;
4. Is attractive as a person;
5. Has the right to exercise control;
6. In an employee status has a sense of commitment to a larger purpose survey by the organization.

Tannenbaum et al. (1974) conducted their study in a variety of organizations in five different countries. They found the same pattern in all plants regardless of size. The right to exercise control (i.e., legitimacy) and commitment to a larger purpose served by the organization were rated as the most important sources of power in all countries. These reasons were followed by expertise, referent, reward, and coercion. Gerald Bachman and associates (1966) reported a similar pattern in their analysis of personnel in utilities, colleges, offices and factories. Results indicate that legitimacy and commitment to a large purpose served by an organization are often viewed by employees as a rationale for continued acceptance of organizational power, with reward and coercion (i.e., punishment) given as the least frequent reasons.

Hierarchy of Authority

Coordination and control exist between units even though they may be organized hierarchically and vertically. Vertical connections link superior with subordinate units within organizations while horizontal connections go between similarly-ranked units differentiated by function and not rank.

The basis of the hierarchy of authority (i.e., vertical links for control) is the division of labor. Each unit is differentiated by task, with the more similar tasks being conducted within the same units as opposed to between units. Consequently, the units, and groups within the units, are assigned different values leading to a ranking on some subjective or objective basis (e.g., prestige, salary, facilities, etc.). These rankings carry differentiated power curves or control systems. Power (or control), therefore, is stratified along a continuum, sometimes called hierarchy of authority. Organizations have a system of rules and procedures ensuring that the directives and decisions of superiors are carried out. Positional power, therefore, can be referred to as a correlate of organizational hierarchy. The difference between the highest and lowest ranking position within the hierarchy is a measure of organizational stratification, and movement between ranks is a measure of organizational mobility. Three of the structural organizational dimensions are related to this hierarchy of authority. These are:

1. Complexity, due to the division of labor into hierarchical ranks;

2. Power and authority, because positions with higher ranks have greater authority, therefore more power within the organization;
3. Stratification, based on the differential between the highest and lowest ranks of the hierarchy creating an inequality.

Often, large complex organizations with multiple levels of hierarchies are characterized as being highly centralized in their decision making. This may partially be because a large number of hierarchically arranged levels makes communication difficult. This difficulty in communication very often blocks knowledge of decisions. This characterization of large organizations is not always confirmed upon close analysis. If, for example, the centralization of power is a goal, elimination of several levels of the multi-level hierarchical structure is all that would be necessary to achieve the goal. In a university, for example, this could be accomplished by eliminating the college deans, which would require the department heads to communicate directly to central administration. Communication in this instance (from the department heads and faculty of each department) would go directly to the top level and, conversely, information would come down the hierarchy more efficiently. This change in the organizational structure would facilitate control and centralization. Decentralization of power and control occurs by increasing the number of levels in the hierarchical structure, thereby assuring each level has decision making responsibilities. Meyer (1968) analyzed 254 city, county, and state departments of finance to determine the relationship between centralization of decision making, and two types of differential authority structures. Meyer's (1968) results can be summarized as follows:

1. Hierarchical differentiation - the proliferation of supervisory levels in an organization were positively associated with decentralization of decision making and the existence of formal rules which partly determine decisions in advance.

2. Functional differentiation - the proliferation of organizational subunits of more or less equal status was positively associated with centralization of decision making, a lack of rules, and practices that allow much discretion to top management in decision making.

Hierarchical differentiation was shown to increase the delegation of decisions to lower levels, while simultaneously increasing the importance of rules that remove decisions from top levels of the hierarchy (Meyer, 1968).

If power, or control, originates from different sources and professionals have power based on their knowledge or expertise while administrators have control or power based on their position within an organization, then an organization is merely substituting one type of control for another when it increases the number of professionals. Professionals are not commonly found at the top of an organization, therefore control becomes positioned at different levels of the structure and originates from a different source. Boland (1973) demonstrated that the type and source of power depends on the particular issue that is the focus of decision making: internal technical affairs are more frequently the domain of professionals, while external relations tend to be dealt with at the top levels of the hierarchy.

Departmental Power (Lateral Power)

Horizontal power is different from vertical power in that organizations are perceived as interdepartmental systems based on the division of labor which is a function and not a status division. Functional units are dependent on other functional units because the total labor process is divided among them. In analyzing power, one attempts to determine the most powerful subunit. A further area of analysis concerns factors that function to vary dependency and power (Hickson et al., 1971; Salancik and Pfeffer, 1974).

Perrow (1970) attempted to identify the most powerful subunit in industrial firms. He identified four functional units:

1. Sales (marketing)
2. Production (engineering)
3. Research and development, and
4. Finance and accounting.

Perrow's (1970) respondents were asked to rank each of the four departments from "most powerful" to "least powerful." Sales departments were ranked as the most powerful in eleven of twelve firms studied. Production was next, followed by finance and accounting, with the least powerful, research and development. Perrow (1970) concluded that such results were obtained because, in a market economy, customers determine the cost, quality, and type of goods to be produced and distributed. Sales provided the link between organizations and their customers. Perrow argued that marketing performed the function of "uncertainty absorption" (i.e., the reduction and editing of information for policy decisions). Because this was a key function of the organization, it gave the marketing department more power. Marketing's power can also be attributed to its lack of dependence on the other subunits. In addition, the marketing department's lower capital investments relative to the other departments minimized the effect of a change in the market and, consequently, the product (i.e., the other departments were more severely affected) (Perrow, 1970). Lawrence and Lorsch (1967) also found that the marketing department had greater influence than the production department in both container-manufacturing and food processing firms. Their reasons were similar to Perrow's -- that is, contact with the customers as well as an ability and opportunity to deal with uncertainty (Lawrence and Lorsch, 1967).

Hinings et al. (1974) studied the power of the same subunits (i.e., sales, production, accounting, and research) analyzed by Perrow. Seven organizations were analyzed which included breweries in the U.S. and Canada and a container company in Canada. Hinings and associates were interested in examining the effect of the dependency among subunits created by unspecified combinations of uncertainty, work flow centrality, and nonsubstitutability. This research was designed to identify which variables are most influential in determining power. The hypotheses in this study were (Hickson et al., 1971):

H1. The more a subunit copes with uncertainty, the greater its power within the organization.

H2. The lower the substitutability of the activities of a subunit, the greater its power within the organization.

H3a: The higher the pervasiveness of the workflow of a subunit, the greater its power within the organization.

H3b: The higher the immediacy of the workflows of a subunit, the greater the power within the organization.

H4: The more contingencies are controlled by a subunit, the greater its power within the organization.

They found that uncertainty itself does not give a unit power; rather, power is achieved by coping with uncertainty. Organizations may allocate task areas that vary in uncertainty to their subunits. The greatest power will be given to those subunits that cope most effectively with the uncertainty (Hickson et al., 1971). Those subunits that were linked directly to organizational output and were connected to other subunits were more powerful. Coping alone, therefore, did not determine power, but the combination of uncertainty, coping, centrality, and non-substitutability in a contingent relationship afforded some departments greater power than others (Hinings et al. 1974).

Salancik and Pfeffer (1974) tested the hypothesis that departments within an organization acquire power to the extent that they provide critical resources to the organization. Building on Thompson's (1967) work on coping with uncertainty, Salancik and Pfeffer (1974) assumed that one persistent and critical uncertainty in universities is the provision of resources. This assumption was based on the premise that just as power is centered in the marketing department which links a business firm to the customer who supplies economic resources, so too power will accrue to the departments in social science organizations that supply links to discretionary funds. Salancik and Pfeffer studied seventeen departments at the University of Illinois. The best indicator of power they found was the proportion of faculty supported by restricted funds.

The next best was the proportion of graduate students, then the department's national rank (Salancik and Pfeffer, 1974).

The findings of Perrow (1970), Hinings et al. (1974), and Salancik and Pfeffer (1974) from a wide variety of business, industrial, and social service organizations suggest that the most powerful subunits are those that control the critical contingencies for other subunits within an organization. One critical factor may be access to customers, but the subunit possessing the greatest lateral power generally forms some critical relationship with the external environment. Boland (1973), regarding vertical power, found that the relationship of the organization to the external environment was controlled by those at higher ranks in the organization, while less critical decisions were often delegated downward in the organization. The conclusion is that those horizontal and vertical units that form effective connective links with the environment, when it harbors critical resources, are the most powerful organizational units.

Structural Correlates of Centralization

The literature on centralization and decision making can be divided into two types. The first is an indicator of the decisions about the regular activities that facilitate the organization's output. Work decisions that are referred to the next hierarchical level are using a centralized decision making structure, a measure of the control of the hierarchy of authority. The second type of literature is an indicator of centralization of organizational decisions regarding policy and resource allocation, or participation in decision making (Hage and Aiken, 1967). Hage and Aiken (1967) found that these two indicators of centralization of power are themselves correlated negatively. Therefore, those individuals in an organization who participate in major decisions do not rely on work decisions to be made at the next highest level.

Pugh et al. (1968), Hinings and Lee (1971), and Child (1972) analyzed the relationship of centralization to specialization, standardization, and formalization of centralization. The definitions of the variables were (Child, 1972):

> Centralization. The extent to which locus of authority to make decisions affecting the organization is confined to the higher levels of the hierarchy.
>
> Specialization. Functional specialization--the extent to which official duties are divided between discrete, identifiable functional areas; Two-role specialization--the extent to which official duties are divided within functional areas between discrete, identifiable positions.
>
> Standardization: the extent to which activities are subject to standard procedures and rules.
>
> Formalization: the extent to which procedures, rules, instructions, and communications are written down.

Hage and Aiken (1967) found a positive correlation between decentralization and low formalization of work related activities in professional organizations. But the rules and procedures related to the internal functioning of the organization may be formalized to protect the highly trained professional from arbitrary decisions of administrators. Blau's (1970) analysis verified this in public personnel agencies. When authority was decentralized, the personnel procedures were formalized. Professionals desire the predictability of formalized personnel selection procedures, salary policies, and other organizational procedures.

Pugh et al. (1968) found formalization and standardization of procedures both negatively correlated to centralization: overall centralization was correlated with standardization and with formalization. Hinings and Lee (1971) and Child (1972) substantiated these findings. These researchers found that as organizations become more centralized they become less formalized; and, as they become decentralized, formalization increased. Centralization and formalization were explained as alternative methods of control. When an organization becomes decentralized, the greater formalization and standardization of work flow serves to control the organization's functioning (Child, 1972).

Several studies (Blau et al., 1966; Child, 1972) showed a negative relationship between measures of centralization, and structuring of activities. Specifically, organizations with centralized decision-making processes have relatively few rules, standardized procedures, and specializations. However, where there are many rules, standardized procedures, and specializations, management tends to delegate decision making to lower levels.

Mansfield (1973) found standardization, formalization, and specialization to co-vary positively, but each tended to vary inversely with centralization. He found that relationships between measures of specialization and centralization varied depending on the size of the organization studied.

Relatively small centralized organizations (i.e., 150 employees) show a direct relationship between measures of specialization and centralization. In other words, where control is concentrated in high, line-management positions, many specialists are employed, presumably to serve as decision makers. Small decentralized organizations employ relatively fewer specialists.

An inverse relationship, however, is found between specialization and centralization in relatively large, centralized organizations employing over 6,000 personnel on the average. Centralized control is generally accompanied by relatively few specialists. Conversely, in large organizations with decentralized control, there are relatively more specialists. Specialists are typically used to advise management in handling problems arising out of the use of rules and regulations, as well as the need to coordinate large, decentralized units. Medium-sized organizations (i.e., between 150 and 6,000 employees) generally show no relationship between centralization and specialization.

Determinants of Structuring and Centralization

Pugh and associates (1969) described the determinants of structuring activities (i.e., the combination of specialization, standardization, and formalization). They as well as others showed that measures of structuring of activities are related to organization size (Pugh et al., 1969; Child, 1973; Reimann, 1973). Gouldner found formalization to be a substitute for direct supervision (1954). Concentration of authority seems related to dependence on an external organization (Pugh et al., 1969). Dependent organizations (e.g., subsidiaries) tend to have centralized authority structures, but relatively little autonomy in decision making. Independent organizations have more autonomy to decentralize decision making authority.

Meyer (1972) supplied additional support for a longitudinal analysis where the effects of organizational size on selected structural dimensions were studied. Previously, theories and research results regarding the effect of organizational size on other structural dimensions were contradictory. For example, Blau (1970) postulated that increased size resulted in greater differentiation which in turn resulted in an enlarged administrative component to effect coordination. Blau also generalized that the larger the organization, the larger the span of control. Pugh et al. (1969) concluded that organizational size was largely determined by size and dependence on the parent organization. They concluded that the effect of size on structure was somewhat indirect; size had its primary influence on intervening variables such as frequency of decisions, coordination, and social control. Inkson et al. (1970a, 1970b) conducted studies in this area, and concluded that organizational size and technology provided dominant influences for structuring activities while dependence provided the determining force for concentration of authority. Small and positive relationships were found by Hall and Tittle (1966) between size and degree of bureaucratization. Inverse relationships were found by Pondy (1969) and Holdaway and Bowers (1971) between organizational size and span of control.

6. FACTOR VI: GOAL ORIENTATION

The Goal Orientation factor reflects those activities that organizations and individuals engage in to determine desired states that the organizational system and its personnel are attempting to achieve through planning, organizing, and controlling. Most organizations, by definition, are goal directed. The variables under this factor focus on the range of goal activities required by an organizational system to determine priorities, to achieve objectives, and to modify or replace those objectives no longer important to the system. As a factor in organizational systems, goal orientation is operationally defined by such concepts as goal setting, goal succession, goal attainment, and goal displacement.

The term goal is broadly defined as a desired end-state or intermediate end-state toward which a system directs its activities or is oriented. Goal setting is defined as the act of establishing goals. Goal succession involves the replacement of a prescribed goal by an improved goal. Goal attainment describes the condition of reaching an established goal and includes performance and productivity. Goal displacement activities reflect the substitution of a goal for which a system was not created for a legitimate, prescribed goal.

The underlying assumption for the goal orientation factor from a behavioral research and systems theory perspective is that goals influence individual and organizational systems behavior and/or performance. From a systems perspective goal orientation is a joint creation of individuals, groups, and environmental components acting on the organization. Goal orientation is a dynamic concept reflecting and being determined by the organization and its environment. The studies reported in this section reflect concerns related to some of the broadly defined concepts of goal orientation.

A. THEORETICAL BACKGROUND

The literature on goals is both theoretical and experimental in nature and reflects both individual and organizational aspects relative to goal orientation. Goals and/or objectives are, according to Huse and Bowditch (1973), determined by several interactive dimensions:

> "(1) the desires of management and workers; (2) the environmental needs provided by the organization; (3) the skills and abilities of the personnel team; (4) the technologies currently available; and (5) the funds available for conducting operations."

Huse and Bowditch add that three different approaches relative to meeting goals and objectives may be used by an organization. The first of these, the "proactive" approach, is applied to formally sanctioned or official long range goals. The second, a "reactive" approach, is associated with the real world or short-run goals--the daily, monthly, or quarterly objectives outlined by the organization. More recently, "Management By Objectives" (MBO) approaches are being adopted by many organizations. MBO systems provide ways of transforming objectives and/or goals into operational outlines for action.

According to Gulick (1948) "a clear statement of purpose universally understood is the outstanding guarantee of effective administration. From a systems perspective the purposiveness and/or direction orientation of organizations and individuals is an important aspect of defining the concept of goals and goal orientation. Etzioni (1964) defined organizational goal as "a desired state of affairs which the organization attempts to realize". Organizations and the individuals comprising an organization have an orientation toward goals, are goal directed and seek strategies to meet both formal and informal, organizational and personal objectives. Hence, we defined a factor called "goal orientation" (Baudhuin, Swezey, Foster, and Streufert, 1980). Theoretical discussions of the broad concept of goal orientation focus on two generic categories, organizational and individual goals.

Simon (1964) believed it was difficult to introduce the concept of organizational goal without reifying the organization--treating it as something more than a system of interacting individuals. On the other hand, the concept of goal appears indispensable to organization theory. To resolve this dilemma, Simon proposed a definition of the "organization goal" concept. The goal of an action is seldom unitary, but generally consists of a whole set of constraints the action must satisfy. It appears convenient to use the term "organizational goal" to refer to constraints, or sets of constraints, imposed by the organizational role that have only an indirect relation with the personal motives of the individual who fills the role. More narrowly, "organizational goal" may be used to refer particularly to the constraint sets that define roles at the upper levels of the administrative hierarchy. In actual organizations, the decision making mechanism is a loosely coupled, partially decentralized structure in which different sets of constraints may impinge on decisions at different organizational locations. Although the description of organizational goals is consequently complex, the concept of goal can still be introduced in an entirely operational manner. Operationalizing the concept of goal necessitates a reference to individual goals, motivations and roles, as well as to the overall organizational decision making system in defining the extent to which goals define the actual courses of action taken by the organization.

Organizational goals are complex, and most, if not all, organizations have more than a single set of goals which are determined from a complicated set of second and higher order interactions among external and internal forces. Huse and Bowditch (1973) illustrated the complexity of organizational goals from the systems perspective in Figure 12.

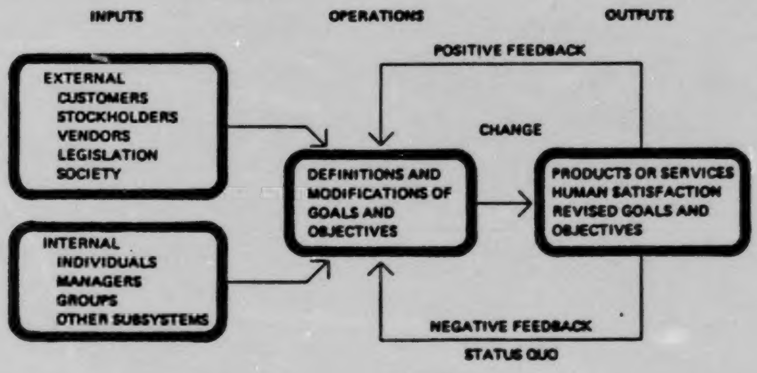


FIGURE 12. COMPLEXITY OF ORGANIZATIONAL GOALS
(from Huse and Bowditch, 1973)

Drucker (1954) operationalized the complexity issue by suggesting that industrial organizations need to develop goals in light primary areas: market standing, innovation, productivity, physical and financial resources, profitability, manager performance and development, worker performance and attitude, and public responsibility. This approach clearly shows some interdependencies among industrial organization goals. For example, market share and innovation are directly related. The profitability dimension is closely related to worker performance.

Perrow (1966) addressed the lack of distinction between types of goals in organizational literature. It is argued first that the type of goals most relevant to understanding organizational behavior are not the official goals, but rather the operative goals embedded in the major operating policies and daily decisions of the personnel. Second, these goals will be shaped by the particular problems or tasks an organization must emphasize since these tasks determine the characteristics of those who will dominate the organization. Perrow made a distinction between operative and official goals and the roles of each in organizational behavior. He contended that if one knows something about the major tasks of an organization and the characteristics of its controlling elite, it is possible to predict its goals in general terms. The major tasks of every organization are four: (1) secure inputs in the form of capital sufficient to establish itself, operate, and expand as the need arises; (2) secure acceptance in the form of basic legitimization of activity; (3) marshal the necessary skills; and (4) coordinate the activities of its members and the relations of the organizations with other organizations and with clients or customers. Each of these task areas will not be equally important at any point in time, and will provide a presumptive basis for control or domination by the group equipped to meet the problems involved.

Perrow (1970) provided a more general sociological model which identifies five components of organizational goals. He included:

- Societal goals - in the most generic sense, those objectives which are common to broadly defined classes of organizations

- Output goals - commercially, things like business services, consumer products, or health care professional services.
- System goals - the organizational plan and methods of operation. For example, some organizations have as system goals rapid growth while other organizations focus on stability and a high profit ratio.
- Product goals - those objectives related to quantity, quality, type of product categories within the line, cost of the product, and market saturation plans for the product reflect this kind of goal.
- Derived goals - reflect those activities organizations engage in to pursue other objectives which may not be directly associated with their primary mission, but can be achieved as a result of the power held by the organization.

While these categories may not be as clearly defined as one might like them to be, they do serve to indicate that organizations have many different goals and, as we have already indicated, these goals tend to overlap. It is also the case that an organization's multiple objectives come from perpetual reappraisals and compromises about the personnel in the organization.

Huse and Bowditch (1973) emphasized this point when they observed that:

> "Whatever criteria are used to categorize an organization's goals,...it must be kept in mind that in and of themselves, organizations do not have objectives; rather, people have objectives, stemming from their own views, and motivations. Thus, so-called 'organizational objectives' are really uneasy and shifting compromises among the individuals within the organization and the demands made by the outside environment."

In addition to the multiple and interdependent nature of organizational and individual goals, Huse and Bowditch (1973) considered the concept of goal displacement in organizations. They suggested that organizations and, for that matter, individuals tend to displace one goal for another.

Warner and Haven (1968) highlighted some of the key problems in attaining instrumental goals in organizations with social change and development programs. These activities and programs too often contribute relatively little to the attainment of the major goals of the organization. Goal displacement, in which the major goals claimed by the organization are neglected in favor of goals associated with building or maintaining the organization, is frequently a problem.

Five major hypotheses and a model of marginal propensity to perform are suggested which show that goal attainment in organizations is maximized when goal displacement is minimal, and that goal displacement is minimal where goals are tangible. If there is a high degree of goal intangibility, goal attainment can still be maximized by keeping tangible goals directed toward the central intangible goals, but it is reduced by displacing tangible goals to peripheral goals of system maintenance. A system of evaluation and sanctioning reinforces both the peripheral displacement of goals and the neglect of the claimed goals in favor of goals designed to maintain the organization primarily as an end in itself. The concepts suggested are not readily operational, nor are the hypotheses empirically tested. It is believed, however, that such attempts at conceptualization are necessary prior conditions to research design and analysis.

Ashkenas and Schaffer (1979) provided a training related perspective to the achievement of goals. They suggested reasons for the failure of training programs to demonstrate a bottom-line results relationship and described a training and development strategy geared directly to producing immediate bottom-line improvement. According to Ashkenas and Schaffer, the failure of training programs to demonstrate bottom-line results is attributed to their focus on changes in specific elements of managerial knowledge, skills, or attitudes rather than on performance results. This observation was confirmed by Campbell (1970) and others. An alternative approach focuses on a specific "breakthrough" goal. In programs based on this approach, managers are taught not how to become better managers, but rather how to accomplish an urgent, important goal in a short time-frame. The focus is on specific, achievable goals rather than on management styles and techniques. Application of this approach to a variety of organizations is possible, and the advantages it offers for goal achievement can be demonstrated.

Several behavioral scientists have argued that goal setting is positively correlated with employee motivation and performance. Locke (1968) provided a framework for goal setting theory which emphasizes the connection between conscious goals or intentions and performance of tasks. The basic assumption to this theory is that individual goals influence an individual's behavior. Verification of this hypothesis is presented in several empirical studies discussed in the experimental section of this review. The goal setting process as per Locke's theorizing and discussion is depicted in Figure 13. If this speculation achieves no other purpose, the theory does seem to provide a good deal of material subject to hypothesis generation and testing.

FIGURE 13. GOAL SETTING PROCESS
(from Ivancevich et al., 1977)

1.	2.	3.	4.
Environmental Incentives	Goal-Setting Evaluation	Goal-Setting Intention	Performance
Establishment of organizational goals and the types of rewards that can result from goal accomplishment.	Selection of the goal-setting process (assigned vs. participative) and an evaluation by the employee of the level of goal difficulty and challenge	The level of acceptance and commitment the employee sets for the goals	The amount of effort and the level of goal accomplishment realized

In a similar fashion, the means to a goal becomes a goal, and the initial goal then becomes a means. Similarly, a means-end chain is defined in organizations where organizational goal decisions are accompanied by decisions regarding the way to achieve each goal. The means-end chain is depicted in Figure 14.

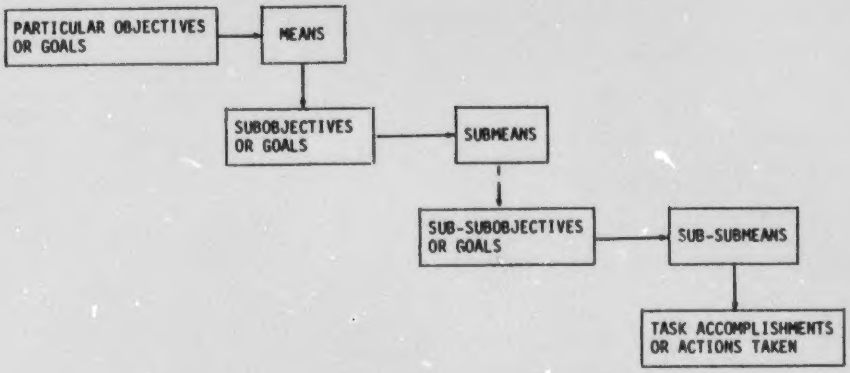

PARTICULAR OBJECTIVES OR GOALS
MEANS
SUBOBJECTIVES OR GOALS
SUBMEANS
SUB-SUBOBJECTIVES OR GOALS
SUB-SUBMEANS
TASK ACCOMPLISHMENTS OR ACTIONS TAKEN

FIGURE 14. THE MEANS-END CHAIN
(from Huse and Bowditch, 1977)

These theoretical considerations of goals and goal orientation led to a concern for actualizing or transforming organizational and individual objectives into actions that would lead to goal attainment. A well known organizational intervention strategy grew out of this concern for operationalizing and achieving organizational goals. Management by objectives (MBO) or *goal setting* developed from the work of Drucker (1954) and Odiorne (1965). Drucker believed that the MBO process emphasized the development of managerial autonomy and/or self control. He observed that:

> "...the objectives of the district manager's job should be defined by the contribution he and his district sales force have to make to the sales department, the objectives of the project engineer's job by the contribution he, his engineers and draftsmen make to the engineering

> department...This requires each manager to develop and set the objectives of his unit himself. Higher management must, of course, reserve the power to approve or disapprove these objectives. But their development is part of a manager's responsibility; indeed, it is his first responsibility" (Drucker, 1954).

The manager is central to the goal setting process and is in the position to maintain and/or control the progress relative to goal attainment.

Steers and Porter (1974) focus on an issue which relates to this management perspective. Management control over the goal-setting process is an integral part of this position. A systematic review of the relevant research dealing with the role played by task-goals in employee performance is presented. Consideration is initially given to the way in which the goals of an organization are translated into manageable tasks for employees to perform. Later, findings of these investigations are placed in the larger organizational context as they ultimately relate to the attainment of organization-wide goals.

Three hypothetical examples are given of how goal-setting factors can be better understood by placing them within a specific motivational framework. An examination of each reveals that performance under goal-setting conditions appears to be a function of at least three important variables: the nature of task-goals, additional situational-environmental factors, and individual differences. They conclude that individual performance on task-goals must be viewed within both a motivational framework and within the larger organizational context.

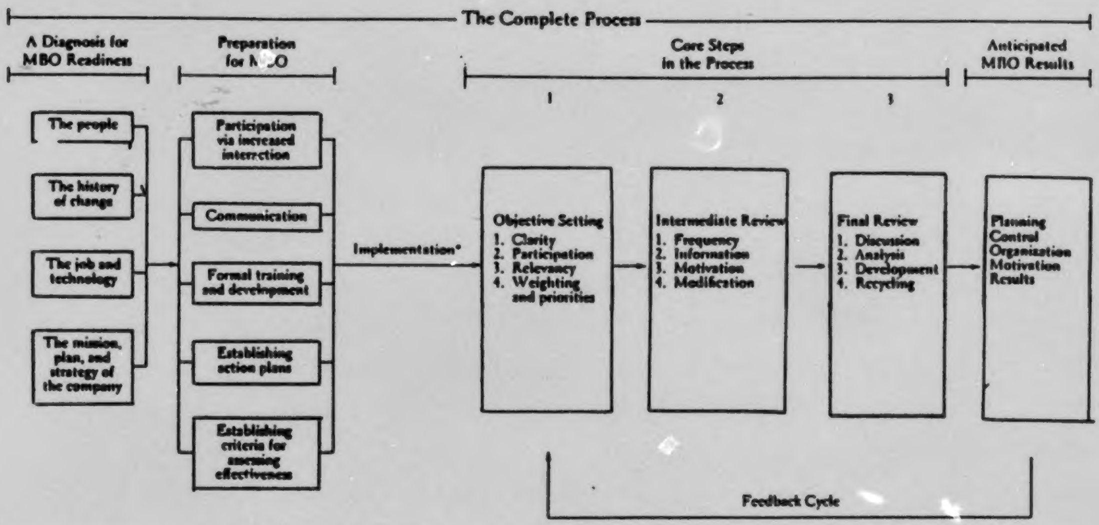
Umstot, Mitchell, and Bell (1978) propose an integrated job design approach which combines job enrichment and goal setting. Productivity and job satisfaction are two dominant concerns of managers. One approach to designing jobs so that these outcomes result is to combine job enrichment and goal setting. Based on reviews of the empirical literature relating these two techniques an attempt was made to better define the interrelationship between them. Their review demonstrated the interaction of goals with such job characteristics as: skill variety, task identity, autonomy, task significance, feedback, role clarity, job challenge, and individual-organizational goal congruence. Further, the review indicated that because most of the interactive effects of goal setting and enrichment are positive, an integrative approach combining the two seemed appropriate to job design.

A general conceptual integrative model of job design was developed to include goal setting, which has been consistently related to higher performance, with job enrichment, which has been related more to work satisfaction. It was theorized that a combination of the two could result in a simultaneous increase in both performance and satisfaction. Because research in this area is very limited, many questions are posed by this model.

Odiorne, on the other hand, brought to the MBO process a concern for mutual understanding between the manager and his staff. Odiorne believes that MBO is:

> "...a process whereby the superior and subordinate managers of an organization jointly identify its common goals, define each individual's major areas of responsibility in terms of the results expected of him, and use these measures as guides for operating the unit and assessing the contribution of each of its members" (Odiorne, 1965).

Ivancevich, Szilagyi, and Wallace (1977) provided a summary of the basic components of the MBO process. The complete MBO process, as depicted in Figure 15, should include: (1) a needs assessment relative to job, personnel, and technology; (2) preparation for MBO including training, determining objectives, determining implementation strategies, and selecting assessment criteria to determine the effectiveness of the process; (3) objective setting; (4) intermediate evaluation of original objectives to provide feedback and/or the modification of objectives if needed; (5) a final evaluation of the results leading to the next MBO cycle; (6) attaining more effective planning, control, and organization through the involvement of personnel that are motivated to achieve results.



*After the preparation phase is completed, it is necessary to develop a systematic plan for implementation.

FIGURE 15. AN MBO MODEL FOR SUPERIOR-SUBORDINATE OBJECTIVE SETTING (from Ivancevich et al., 1977)

To date, probably the most extensive empirical evaluation of MBO is by Carroll and Tosi (1973), who implemented and evaluated an MBO program for a large industrial consumer goods manufacturer. Some of their findings include:

- The manager or supervisor should build a climate of trust rather than focusing on punishment dimensions.

- The manager or supervisor should spend as much time listening as possible.
- The manager or supervisor should utilize reflective summaries to avoid the chance of misunderstanding.
- The manager or supervisor should invite subordinates to openly vent anger or differences of opinion relative to company issues, policies, or procedures.
- The manager or supervisor should invite the subordinate to resolve problems or conflict before the counseling or feedback session is terminated.

McConkie (1979) clarified some of the major issues related to the concept of goal setting and MBO. Under the guise of Management by Objectives (MBO), the notions of goal setting and performance appraisal have assumed many different shapes and purposes. McConkie synthesized from the works of leading MBO experts the common elements of their respective descriptions and definitions of how goals should be set and how performance appraisals should be conducted under the MBO rubric. Their review of the literature confirmed the diversity of opinion regarding MBO. However, a solid notion of what MBO is generally thought to be can be extracted from the commonalities in the research. With regard to goal setting McConkie found consensus regarding the importance of an organization adopting objectives which are specific, measurable, placed in a time framework, prioritized, and joined to an action plan. Also, most experts emphasized the criticality of subordinate involvement in goal setting to an integration of individual and organizational goals, as well as need for goal flexibility in facilitating organizational change. Regarding performance appraisal, it is generally agreed that appraisals be held periodically, and that they be conducted on the basis of objective performance standards which are mutually agreed upon by both superiors and subordinates. Such commonalities can serve to give a more general, widely applicable definition of MBO and the notion of goal setting.

The growth of MBO as a goal setting procedure and management method in organizations has been widespread. This growth is based on the appeal to common sense, its relatively uncomplicated formula for implementation, and its growing body of effective lobbyists. From a theoretical perspective, Brady (1973), Carvalho (1972), McConkey (1965), Reddin (1971), and Schleb (1971) all provided basic support to the arguments of "common-sense" appeal and the uncomplicated format of MBO programs.

Vancil (1976) presented a slightly different analysis of goals and goal setting in organizations. He viewed the goal setting process as a part of a broader organizational concept called "strategy." "Strategy is the conceptual glue that binds the diverse activities of a complex organization together..." Vancil observed and then suggested that "one should think of the strategy as a collection of strategies, one for each manager, linked together by a progressive series of agreements on objectives, constraints, and policies, and plans and goals. Rather than viewing goal setting as the central focus in the MBO context, Vancil viewed the "strategy" paradigm as a more accurate reflection of the complexity of organizational systems. The relationships between levels of management and strategic interactions is depicted in Figure 16.

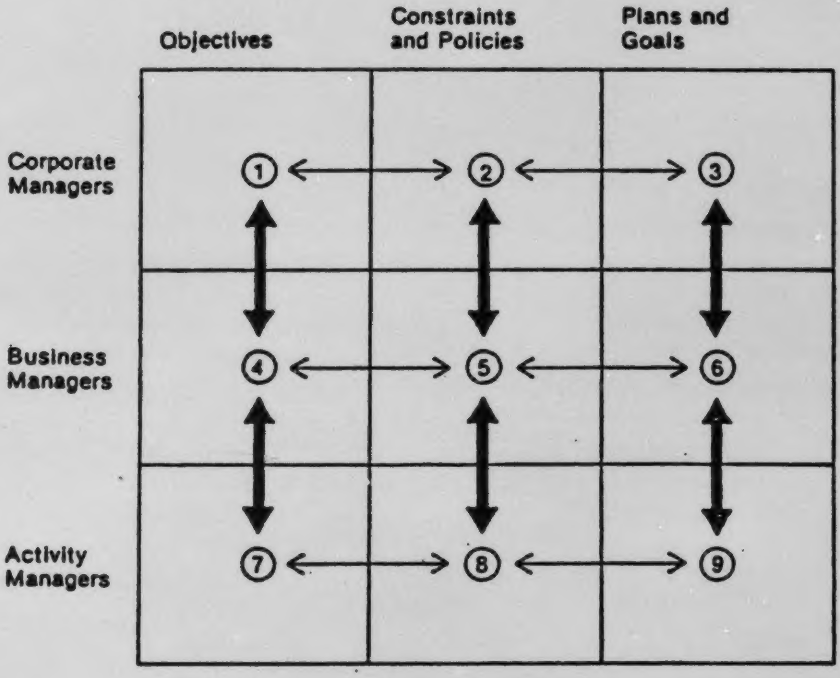


FIGURE 16. HIERARCHICAL STRATEGIC RELATIONSHIPS
(from Vancil, 1976)

A strategy, then, consists of a complex planning process with hierarchical interactions among various organizational levels and between the objectives constraints, and policies, and the plans and goals dimensions of that strategy. Implementing strategy therefore involves more than the superior/subordinate MBO counseling and feedback. Strategy implementation requires a conscious choice among alternatives guided by two way interactions among levels of hierarchy and the components of "strategy."

Finally, Hrebiniak (1978) posits two divergent types of organization to illustrate structural features of organizations relative to environment and goal setting. This view is consistent with a systems perspective and the interrelationships found in the factor analytic taxonomy of organizational systems (Baudhuin et al. 1980). Table 14 depicts two hypothetical organizational types relative to a number of organizational characteristics.

TABLE 14. CHARACTERISTICS OF TYPE A AND TYPE Z ORGANIZATIONS
(from Hrebiniak, 1978)

Type A	Type Z
• Stable • Hierarchical (monocratic) • Simple in structure –Centralized –Reliance on rules and standardization • Motivation to play it safe –Conformity is stimulated • Communication distorted	• Dynamic, changing • Less emphasis on hierarchy for coordination and decision making • More complex, decentralized structure needed to monitor external conditions; less emphasis on rules • Risk taking is stimulated; jobs are flexible, with autonomy • Communications are open, and confrontation over task issues is the norm

This analysis of goals and goal setting is aptly summarized by Hrebiniak (1978) relative to the functions of goal setting as per the Type A and Type Z organizational structure, as shown in Figure 15.

TABLE 15. SUMMARY: FUNCTIONS OF GOALS AND GOAL SETTING RELATED TO DIFFERENCES IN ORGANIZATIONAL STRUCTURE

(from Hrebiniak, 1978)

Functions of Goals and Goal Setting	Type A	Type Z
1. Legitimization	Formal; informal or indirect legitimization is far less important.	Formal, but indirect legitimization is also important, e.g., when goals distinguish the organization from its competitors.
2. Act as Constraints	Main purpose; goals serve to define range of acceptable behavior and guarantee consistency of performance and top-down control.	Not as important as in mechanistic systems; rules, and rigid guidelines for action are far less likely or desirable
3. Create Discontent	Change or threats to status quo are avoided; conservatism and control are more likely legacy of goals than discontent and desire to alter the system.	Emphasis on underspecification of tasks, autonomy, and solving problems arising from turbulent environment, results in creativity and novel solution being rewarded; goals act as motivators, standards to meet and surpass.
4. Development of Commitment	Top-down control and monocratic structure, at best, develop commitment among oligarchs; distance between hierarchical elite and lower levels of organization.	Ad hoc centers of control and decision making foster involvement and participation in goal setting; having more at stake develops commitment to goals and goal-setting process, and organization.
5. Reduction of Uncertainty	Stable predictable environment; function is not very important.	Uncertain, turbulent environment makes this an extremely important function of goal-setting process.
6. Learning	Stablity of external conditions reduces need for and importance of this function.	Continuous evaluation of status quo: assessment of strengths and weaknesses focuses on where organization is versus where it should be; future perspective with projections of change, development, and learning.
Additional Observations and Effects		
1. Locus of goal setting	Top levels	Ad hoc centers of decision making; more diffuse process.
2. Correspondence between formal and operative goals	Little	Strong
3. Probability of goal displacements	High probability of means-ends inversions and goal displacements	High likelihood of strong correspondence between formal and operative or informal goals

1S[illegible]229

Systems Concepts and Goal Orientation

The concept of goal orientation is, by definition, an integral part of the general systems model. Biological, social, and/or organizational systems appear to have multiple goals or purposes. Organizations seek multiple goals if for no other reason than that they are composed of individuals and subunits with different values and objectives. Organizations need to determine and/or define what they desire to attain, given the opportunities and the various constraints imposed by the surrounding environment. According to Gross (1966) the overriding presence of a goal orientation separates the organization from other kinds of social systems. The open system perspective relative to goal orientation is useful in illustrating how the function and importance of goals, goal setting, and goal attainment are contingent on the nature of the interaction between the organization and the surrounding environment. An organization, as an open system, must maintain viable relationships with its environments, and these system-environment boundary exchanges are suitable objects of study.

However, it is rather easy to understand how systems theory and goal orientation might be construed as mutually complementary by some and mutually exclusive by others. In the first instance, the significance of goals and objectives in systems theory is manifest. For example, the fundamental systems concepts of Feedback, Multiple Goal-Seeking, and Equifinality all are goal-dependent attributes.

On the other hand, each of these two theoretical perspectives has its own distinguishing characteristics, to wit:

- The goal orientation tends to focus on products, while systems theory focuses on processes.
- The goal orientation is essentially prescriptive; systems theory descriptive.

- The goal orientation deals primarily with concrete, or tangible, dimensions; systems theory with the more abstract.
- The goal orientation is inherently atomistic in orientation; systems theory is organismic.
- The goal orientation tends to treat situations in digital terms; systems theory in analog.
- The goal orientation operates primarily in an algorithmic mode; systems theory in a heuristic mode.

Such distinctions, though not pure by any stretch of the imagination, nonetheless elucidate general orientations of which the researcher should be cognizant.

Goal orientation and the goal setting component in organizations serve a number of purposes. Hrebiniak (1978) identifies six functions which, from the systems perspective, have relevance to this discussion. Table 16 provides a listing of these functions.

TABLE 16.
FUNCTIONS OF GOALS AND GOAL SETTING IN ORGANIZATIONS
(from Hrebiniak, 1978)

1. To legitimize the organization. Legitimacy is granted formally (e.g., by a corporate charter) and informally (e.g., as a result of market mechanisms).
2. To serve as constraints on individual and organizational behavior.
3. To create discontent; to provide opportunities to achieve or targets at which to aim.
4. To help develop commitment to the organization.
5. To reduce uncertainty and provide facts for organizational members to use in decision making.
6. To aid in the process of learning and adaptation.

Goal seeking signals what an organization intends to do. Goal orientation is the first step in providing legitimacy to an organization. Constraints are a component of goal orientation, i.e., goal setting provides limits and/or boundaries of organizational action and individual behavior. Goals and goal setting also act as an organizational aggravation to both the system and its subsystems. Goals and goal setting are, in part, designed to create discontent and/or disequilibrium which, in accordance with general systems and psychological principles, is a motivating force for the achievement of dynamic homeostasis or system balance. Goals also provide a place on which systems and subsystems can hang their commitment to the organization. A very important function of goals and goal setting is to reduce the degree of uncertainty for the organization. In essence goal orientation provides a framework for reducing entropy in the organizational system. Goals help to determine a host of organizational activities such as raw material buys (input), personnel and/or hiring decisions relative to production process requirements (through-put), and sales/marketing decisions relative to the distribution of goods produced (output). Goal orientation, goal setting and goal attainment have a direct bearing on organizational learning. Organizations learn and adapt on the basis of goal setting and productivity relative to achieving prescribed goals. An organizational learning experience is inherent in the process of assessing performance against goals. Organizations which do, in fact, learn from this exercise are relating to the systems concept of equifinality. In short, the concept of goal orientation is an important systems concept.

B. RESEARCH

The research on goals and goal orientation has emphasized a number of interrelated areas with most of the studies focusing on goal setting activities, goal attainment, and feedback dimensions relative to goals and performance. A good share of the research presented in this review reflects recent attention to MBO models and other goal setting paradigms. Much of this research is related to several general psychological principles. According to Huse and Bowditch (1973), employee performance--the results of goal setting and/or MBO processes--is predicated on three assumptions:

> "1. A subordinate can improve his job performance only if he knows what is expected of him. The process provides him with better information about priorities, expected results, the methods by which results will be measured, and the resources available to him.
>
> 2. In order to improve his job performance, a subordinate needs feedback about how he is doing. This is the most basic of the three principles, since knowledge of results, or feedback, is essential for improving job performance.
>
> 3. A subordinate must be able to obtain coaching and assistance when and as needed in order to improve his job performance. This means that the climate must be changed from management by crisis so that the manager can act as a helper rather than as a judge"(Huse and Bowditch, 1973).

Bass (1966) found considerable disparity between what managers say and do relative to organizational goals or objectives. Sixty managers from two industrial organizations were asked to give weights to six potential company goals. The results indicated that, although profits ranked highest, community welfare and improving company operations also received high rankings. Female executives of a service company placed more emphasis on employee welfare and community service than on profits. Male executives in public service companies placed more weight on community welfare and the improvement of operations. In short, though profits may be expressed as the major goal of an organization, managers act differently relative to goals and objectives and, further, this goal displacement is a function of the kind of organization in which the manager is working. Table 17 depicts the results of a version of the Bass "Exercise Objectives" research. Organizations have multiple goals that change and/or are displaced depending on the type of organization and personnel involved.

TABLE 17. RESPONSE OF MANAGERS TO "EXERCISE OBJECTIVES"
(from Huse and Bowditch, 1973)

Objective	Percentage of Weight Given
Profits	35
Growth	11
Community welfare	21
Improve operations	22
Meet competition	11

Adapted from B.M. Bass, "Exercise Objectives," in *A Program of Exercises for Management and Organizational Psychology,* Pittsburgh: Management Development Associates, 1966.

Goal Setting

The research on goal setting has been conducted in a variety of laboratory and field settings. Locke (1968) and Bryan and Locke (1967) examined the relationship between task performance and conscious goals. College students performed a variety of tasks such as arithmetic manipulations, memorizing, and measuring perceptual speed. The results indicated that: (1) goals which are specific lead to higher performance than vague "do your best" type goals; (2) difficult specific goals result in lower attitudes toward the task and less satisfaction than easy goals; and (3) specific difficult goals create more interest than the vague "do your best" type goal.

Latham and Baldes (1975) and Latham and Yukl (1975) investigated the relationships between goal setting and performance. Both studies were related to Locke's theories of goal setting, but were conducted in applied or field settings. In the first study truck drivers in the lumbering industry were studied over a twelve month period. The results of this research indicated that performance improved immediately with designated difficult specific goals. In the second study Latham and Yukl found that participative goal setting was more effective than assigned goal setting relative to performance, particularly with the uneducated loggers.

Dossett, Latham, and Mitchell (1979) investigated the effects of various goal setting conditions, knowledge of results and individual differences on employee behavior with goal difficulty held constant. Female clerical personnel (N=60) were randomly assigned to participative, assigned, and "do best" goal conditions on a clerical test. Specific goals led to higher performance than did the "do best" goals. With goal difficulty held constant, there was no significant difference between the assigned and participative conditions on performance or goal acceptance. Goal attainment, however, was higher in the assigned condition than it was in the participative condition. No main or interaction effects were found for knowledge of results (KR) or for individual difference measures with performance or goal acceptance. However, high self-esteem individuals who received KR attained their goals more often than did individuals with low self-esteem when the goals were participatively set.

A second study was conducted with employees from the same sample in a performance-appraisal setting over an eight-month time period. Assigned goals resulted in higher performance and greater goal acceptance than did participatively set goals. There was a positive linear relationship between goal difficulty and performance in the participative condition only.

Latham and Saari (1979) studied the relationship between supportive behavior and goal setting. This study investigated three key aspects of System 4 (Likert, 1967) management theory: supportive relationships, participative decision making, and goal setting. The importance of supportive behavior by an authority figure when setting goals was tested using a brainstorming task. Ninety college students were randomly assigned in a 2 x 3 design to a supportive or nonsupportive condition and to one of three goal-setting conditions (assigned, participative, and "do your best"). Goal difficulty was held constant between the assigned and the participative conditions. Supportive behavior resulted in higher goals being set than nonsupportive behavior. Participately set goals led to better performance than assigned goals. The assumption that "the differences, if any, that exist between an industrial and a university setting are minimal," however, is questionable.

Kim and Hamner (1978) compared the effects of performance feedback and goal setting on productivity and job satisfaction. A quasi-experimental design was used to investigate the interaction of these variables in a large telephone company. Three experimental groups received either extrinsic feedback and intrinsic feedback alone, or extrinsic and intrinsic feedback with goal setting, while a fourth group received only goal setting instructions. Their results indicate that it is possible for goal setting alone to enhance performance without a formal knowledge-of-results program. This finding provided some external validity to Locke's theory of goal setting. However, results also showed that when evaluative and non-evaluative feedback were added to a goal-setting program, performance was generally enhanced beyond that found in the goal-setting only group. The authors suggested that future research should look into the additive effect of goal setting with evaluative and descriptive knowledge-of-results on task performance.

Weed and Mitchell (1980) investigated the causes and consequences of two types of uncertainty (environmental and behavioral) in a simulated job environment. Sixty-four randomly selected subjects were divided into 8 experimental conditions. There were two levels of task structure (ambiguous, structured), two levels of leader style (high IS-low CONS and low IS-high CONS), and two levels of goal setting (no goal, specific goals), resulting in a 2 x 2 x 2 factorial design. The task involved three separate designs to be drawn on a blueprint according to a series of instructions. Weed and Mitchell found that the structuring leader and structured task produced greater certainty than the considerate leader or the unstructured task. In this study, goal setting had no effect. The

00230

same independent variables and increased certainty resulted in higher performances.

Steers (1975) conducted a study of perceptions of five factor analytically derived task-goal attributes relative to supervisor performance. The five attributes included: (1) participation in goal-setting; (2) feedback on goal effort; (3) peer competition for goal attainment; (4) goal difficulty; and (5) goal specificity. Previous research had identified these attributes as potentially having an important impact on resulting performance. Based on this earlier evidence, Steers hypothesized that four of the five attributes (participation, feedback, goal difficulty, and goal specificity) would be positively related to performance, while the fifth (peer competition) would be unrelated to performance.

Questionnaires were completed by 133 female first-level supervisors in the Accounting and Customer Service Department of a large public utility. The questionnaire packet included the Task-Goal Attribute Questionnaire, the Adjective Checklist, demographic data, and performance measures. The data analysis was performed on two levels. On the first, subject scores for each of the five task-goal attributes were correlated with two performance measures for the total sample. On the second, the sample was divided into high and low n Achievement Groups by need strengths. Correlational analyses were run separately for each group between task-goal attributes and performance measures. Before need strengths were taken into account, little consistent relationship was found between the five task-goal attributes and performance. However, after dividing the group, it was found that performance was significantly related to increases in feedback and in goal specificity for high n Ach subjects, and to participation in goal-setting for low n Ach subjects. Goal difficulty and peer competition were found to be unrelated to performance for both groups. These results were then compared to other similar studies. Steers concluded that individual difference factors, like n achievement, must be taken into account in any comprehensive theory of goal-setting in organizations.

Umstot, Bell, and Mitchell (1976) examined the effects of job enrichment and goal setting on employee productivity and satisfaction in a simulated job environment. This study reflected a concern for the quality of work issue and job design approaches which combine increased productivity with increased job satisfaction. In the first phase, two conditions of goal setting (assigned goals vs. no goals) and two conditions of job enrichment (enriched vs. unenriched) were established, producing four experimental conditions. The results indicated that job enrichment had a substantial impact on job satisfaction but little effect on productivity. Goal setting, on the other hand, had a major impact on productivity and a less substantial impact on satisfaction. In the second phase, (after 2 day's work), people with unenriched jobs worked under the enrichment conditions and people originally without goals were assigned goals. Again, job enrichment had a positive effect on job satisfaction, while goal setting had a positive effect on performance.

Goal setting research has also focused specifically on the MBO intervention strategies conducted in field settings. While rigorous scientific methods and/or control procedures cannot be used in such field research settings, when field research or goal-setting and/or MBO interventions are combined with the wide range of laboratory research on goal setting, interesting conclusions regarding the impact of goal setting strategies may be reached.

Raia (1965, 1966) conducted two longitudinal analyses of an MBO program for a consumer goods corporation. In the first case 112 managers were analyzed relative to production after an MBO program had been implemented. Results indicated an increase of 3 percent per month from production declines of 4 percent per month prior to the MBO implementation. Additionally, Raia discovered that managers were more sensitized to the mission and goals of the company, showed more enthusiasm toward the task of evaluating and counseling workers, and thought that communication had improved following the implementation of MBO.

Raia conducted a second study at this corporation four years later using similar data collection techniques with many of the same managers used in the original study. As in the first study, he found that productivity continued to increase along with goal attainment. However, a number of negative perceptions also were discovered in this study:

1. The MBO program was being used as a whip.
2. The MBO program created increased administrative paperwork.

> 3. The MBO program remained only at middle and upper management levels.
> 4. The MBO program seemed to overemphasize production.
> 5. The MBO program did not provide performance incentives.

Despite the widespread use of MBO strategies, increased production, and the testimonial support for MBO, the strategy was perceived to have some problems.

Carroll and Tosi (1973) investigated the accomplishments of an MBO program which was designed to operate over a period of time to:

> "1. Help the individual improve his job knowledge and skills;
> 2. Assure two-way communications between the subordinates and supervisors;
> 3. Convert Black and Decker organizational goals into targets for the individual; and
> 4. Appraise the individual's performance."

Attitude surveys and interviews were used to determine what objectives the MBO program was achieving. Based on this data, modifications were then made to the program. The original data from this study suggested that:

> "Subordinates were more positive toward the program as more difficult goals were set.
>
> Increased goal clarity, relevance, and importance resulted in more positive attitudes toward the program and the interactions between superiors and subordinates.
>
> The more frequent the feedback sessions, the greater the subordinate's satisfaction, goal accomplishment, and relationship with the supervisor.
>
> The second phase of the modified program at Black and Decker involved improving the original program by placing increased emphasis on total organizational involvement in goal setting, increased training of the top managers in goal setting, and the use of

> a more reliable attitude survey. The second-phase data analysis, in which the interpretation was based on interviews and questionnaire responses, indicated that:
>
> Managers now perceived MBO as a way of developing subordinates.
>
> More managers believed that they had trouble with "personal improvement" goal setting with subordinates.
>
> Satisfaction with MBO increased, and there was an increase in the amount of work effort expended in goal setting.
>
> There was no change in the amount of participation by surbodinates in the goal setting process" (Ivancevich, et al., 1977).

Most of the research findings have indicated that success in any MBO program requires support from top management. One of the major problems with the study just cited was that no comparison group was used from within the company. Hence, any conclusions drawn from these data should be interpreted very cautiously.

Support from top management relative to implementation of MBO programs was investigated by Ivancevich (1972). Two companies were used for the study. The first company had its MBO program implemented through top management while the second company implemented the program through its personnel department. This study was conducted to assess the impact of the power and authority dimensions on the implementation of MBO programs. The results of this assessment indicated that the company using the personnel department for implementation of the MBO program had significantly less power and authority than the top management implementation strategy. Short-run improvements in terms of job satisfaction were greater in the top management plan, but these differences tended to regress when measurements were taken at the end of thirty months. What this research suggested was that the location of the power base during initial implementation of an MBO intervention is an important consideration and that the program requires reinforcement of procedures, training, and steps if one wishes to maintain improved performance and satisfaction.

In addition to the attitudinal study just cited, Ivancevich (1974) also conducted a thirty-six month study in the same organization which focused more on "hard-core" performance data. In this case three different plants were used with two plants using MBO interventions and one plant serving as a baseline unit. Results indicated that the most significant performance improvements came in the MBO plant which utilized a reinforcement program three months into the intervention. Letters, memos, counseling on the use of MBO, and discussions among superiors and subordinates were used as reinforcement schedules. The study suggested that further investigations of reinforcement strategies is required before the maintenance of performance improvements aspect can be more clearly operationalized relative to MBO interventions.

7. METHODOLOGY

The previous sections of this review have dealt with specific focus areas within organizational psychology that were reflected in the factors obtained. At this point, we will depart from that previous procedure and will more closely examine the simulation methodologies which have been used in past research efforts. The reason for the emphasis on simulation is twofold. First, it seems appropriate to limit our review to simulations and related procedures since the work to be accomplished under this contract will utilize simulation methodologies. Second, a review of all methods that have been employed in organizational psychology would be voluminous and cumbersome. Such reviews are moreover available, for example, in the recent "Handbook of Industrial and Organizational Psychology," (Dunnette, 1976).

A. THE ORGANIZATION AS A SYSTEM

It need not be reemphasized that organizations, both large and small, both complex and simple, can be considered in the terms of system theory. If organizations are indeed best described as systems, then any methodological approach to organizational psychology should be adaptable to a systems theory conceptualization. If, for example, we were interested in determining the effects which stress has within and upon an organization, we would have to study not only inputs into and outputs from the organizational systems, but we would also have to consider what is happening as the stressful information is processed within the organization, i.e., we would have to examine organizational demands, organizational capability and organizational capacity (c.f., Drabek and Haas, 1971). Such a view of the organization as an entity should be reflected in the methodology with which the organization is studied. As we shall see below, simulation is considered to be an ideal methodology for that purpose.

B. EXPERIMENTING AND THE ORGANIZATION

One of the primary purposes of studying the organization is the attempt to gain additional knowledge about its functioning. Different researchers have attempted to utilize different methods to gain knowledge about organizational functions (Evan, 1971). In earlier years, the choices were between experimental research in the laboratory vs. empirical or observational research in the field. Later additional and more sophisticated empirical, experimental and modeling methodologies were added. Let us take a closer look at these methods.

The purpose of the experiment, of course, is to obtain causal inference based on information about relationships among organizational variables. To achieve that end, the experimenter has to manipulate conditions which allow him or her to introduce events of his or her choice and to determine the level of these events. In organizational research, the majority of earlier experiments have contrasted events which represented initial conditions at the outset of an experiment. While many of these experiments have been carried out in the field, others have utilized a laboratory setting. For that matter, the word laboratory in organizational psychology can be meant in a broader sense than in some other behavioral sciences, as suggested by Zelditch and Hopkins (1971):

> "By laboratory is meant any setting that allows the investigator to control rigorously the conditions under which he makes his observation."

With this definition, the "field" could be considered a laboratory, whenever the experimenter maintains control over events in that field. However, maintaining experimental control when one wishes to research real organizations tends to be rather difficult. To again quote Zelditch and Hopkins:

> "Actual organizations are rather naturally often reluctant to turn themselves over to (the experimenter's) care. Moreover, to experiment with fully manned operating systems can be very costly."

As we will suggest below, an alternative to experimenting with actual organizations may be the use of simulations.

C. ALTERNATIVES TO EXPERIMENTING WITH ORGANIZATIONS

Despite the difficulties of using strictly experimental techniques in organizational psychology, we would, of course, prefer to use experimental methods whenever possible to obtain data from which causality can be inferred. Early theorists (Durkheim, 1950) were aware of the differences between experimental and other methods:

> "When...(phenomena) can be artificially produced, at the will of the observer, the method is that of the experiment, properly so called; when, on the contrary, the production of facts is not within our control and we can only bring them together in the way that they have been spontaneously produced, the method employed is that of indirect experiment or the comparative method...Since...social phenomena evidently escaped the control of the experimenter, the comparative method is the only one suited in sociology" (Durkheim, 1950).

More recently, Moser (1965) argued that:

> "It is regarded by many as a truism that the social scientist is rarely able to conduct strictly controlled experiments and, consequently, can establish the causative connections which are held to be the essence of scientific progress. There is no denying that strictly controlled experimentation is barely feasible with human populations and that this does account for tentativeness of many social research results."

In other words, progress toward causality inference for organizational research in the first half of the 20th century was quite limited. Even in 1968, Price (1968) considered the method of experimentation to be superior for verifying propositions of organizational phenomena but predicted that "use of such experimentation will not expand significantly in the near future."

While there have been some early attempts to use experimental methodology with organizational research (e.g., Bavelas, 1950; Coch and French, 1948), a good number of innovative experimental methodology in organizational psychology had not surfaced until the last 20 or so years. Nonetheless, experimental methods for organizational research are now much more easily available (Fromkin and Streufert, 1976). Obviously, these methods must differ from those proposed by behavioral scientists who are primarily concerned with testing miniaturized theoretical propositions (e.g., Festinger, 1953). Zelditch and Hopkins (1971) described a number of types of laboratory experiments with organizations that are possible. The are:

1. The miniature replica. The experimenter creates a system having a complete minimum set of units and ranks as well as other criterion properties which match the organization.
2. The part replica. The system contains less than the minimum sets of units and ranks. In such a system, the experimenter may simulate the missing units or ranks so that subjects think of themselves as participating is a complex organization.
3. The "near" organization. The experimenter creates all or some of the minimal number of units and ranks and at least one, but not all other, organizational criteria.
4. The simply-structured unit. The experimenter creates a system consisting of a single unit which exhibits none of the defining properties of an organization.

It seems self-evident that the closer the method employed comes to utilizing a near replica, i.e., the more it represents the system being modeled in all its aspects, the more likely it will provide us with correct information about the functioning of the real system of interest, even though a more and more precise replication may not necessarily be cost effective (c.f. Fromkin and Streufert, 1976). Nonetheless, some, albeit limited, evidence suggests that an increase in fidelity of the model does not always improve the data obtained (Gray, Mayhew and Campbell, 1974).

D. SYSTEMS THEORY AND METHODOLOGY: THE MOVE TOWARD SIMULATION

We have already considered the organization as a system which should be studied with a methodology that approaches the system of interest in complexity. McLeod (1974) has considered this problem in detail. He stated:

> "The development of computer models and the planning of simulation experiments sophisticated enough to be useful for the study of the complex problems we face will require the systems approach. General systems theory and simulation have much in common, while the ways in which they differ are complimentary. Advantages should therefore accrue through a symbiotic relationship."

Similar statements have been made by McCluskey (1972). This author asserted that:

> "Simulation is a physical procedure of symbolic representation of certain aspects of a functioning system...certain kinds of systems require the use of some form of simulation."

The argument that simulations are the ideal research forms for investigations in organizational psychology have not only come from those who see a symbiosis between the simulation method and the organizational system. They have come also from researchers who suggest that simulation is "natural" as a procedure for eliciting organizational relevant behavior from individuals. Tallman and Wilson (1974), for example, argued that games are a universal aspect of human existence and that simulations are effectively understood as games by the participants (at least initially). As such, games are isomorphic to social structure. Behavior which occurs in the simulation is most likely behavior that would have occurred in the organization, if the simulation was indeed a sufficient replica of that organization. Such a view has stimulated a great amount of effort to develop organizationally relevant simulations (see for example the bibliographies of simulation techniques by Rockelein, 1967, and Walther, 1975).

E. THE USE OF SIMULATIONS FOR EXPERIMENTATION IN ORGANIZATIONAL PSYCHOLOGY

Definitions of Simulation

Before considering the appropriateness of simulation techniques for specific problems in organizational psychology and discussing the various advantages and disadvantages of these techniques, it may be important to consider definitions of simulation. There are nearly as many definitions of simulation as there are scientists utilizing the simulation method. A considerable number of these definitions have been collected by Pritsker (1979). A look at this collection suggests that definitions are as varied as the kind of simulation in which scientists are engaged. A scientist who models events on a computer will likely use a somewhat different definition than a scientist who employs all manned simulations. The vast majority of writers, however, agree that a simulation represents a system that has been reduced in size and is operating over time. For the present purposes, we will define simulation as the use of an operating model of a system over time for purposes of experimenting (to reveal characteristics of the model and by implication of the system modeled), of training (to allow transfer of training to the system being modeled), of assessment (to measure performance characteristics as they may be expected in the system being modeled) and of theory construction (to construct successively improved models of the original system where the model becomes the theory about the functioning of the original system).

Bridging the Gap Between Field and Lab

It has already been stated that a simulation experiment concerned with organizations should use a miniature replica of the organization wherever possible. However, we must not only be concerned with a realistic representation of the organization itself; we must also consider the effect of the simulated environment on the subject (i.e., the participant or group of participants) whom we have asked to operate some simulation model. Drabek and Haas (1971) have suggested the term "realistic simulation" to describe a method in which the requirements placed upon participants are both reasonable and realistic. They suggested that this simulation method requires:

> "1) a 'real' group: i.e., a group of participants who are familiar with the task; 2) that this group be assigned tasks identical to those it normally encounters; 3) that this group should work in a setting where ecological relationships are maintained as well as 4) an environment, both physical and symbolic, which is identical to that

> with which the organization normally interacts; and finally 5) the subjects must not be aware that they are operating in an experiment."

In other words, bridging the gap between field and laboratory requires that we obtain high fidelity in representing not only the organization and its characteristics, but also the experience of participants by matching the miniature replica to the organization to the fullest extent possible.

Reasons for the Use of Simulation Techniques

The value of experimentation to permit causal inference has already been discussed. McCluskey (1972) pointed toward a number of conditions under which simulation appears to be the ideal form of experimentation. He believed that simulation should be utilized when: 1) "the expense and time involved in operating large military or industrial systems (for experimental purposes) are simply prohibitive." In this case, simulation techniques should be utilized to make time and expense factors manageable. 2) Simulations should be used when real-world systems cannot be used for safety reasons. 3) Simulations are the best choice in situations where ethical or political constraints keep us from experimenting with the organization itself. 4) Simulation is the best technique when past, future or hypothetical events should be explored; for example, when we consider modifying an existing system or constructing a system that is presently non-existent. In this regard, Bass (1963) has emphasized that:

> "Only in simulation can really radical innovations be tried; for no survey or case observation can uncover, nor can any field study be attempted of an organizational idea which is untried, untested, and seemingly uncertain in outcome."

Similar points of view are also expressed by Evan (1971). Finally, 5) Simulation is the ideal research method when control over real-world events for experimental purposes becomes quite difficult because of their specific characteristics or because of the potential consequences of such control.

In other words, the utilization of simulation techniques for experimental purposes is ideal when we wish to investigate variables involved in the functioning of an organizational system where we cannot use that system itself for purposes of our experiment and where we wish to obtain data that are representative of the functioning of that organizational system.

Advantages of Simulations

In the last section, we already discussed some situations where simulation represents the ideal research method in organizational psychology. A number of additional advantages need to be listed (e.g., McCluskey, 1972). For example, simulations may be designed for multiple purposes in addition to experimentation. They may be employed for model evaluation, for decision analysis, for assessment and for training. Often, a single simulation technique may be useful for two or more of these. For example, it is possible to use the same simulation to first determine how variables in an organizational setting interact and later to train personnel to optimize their performance on the basis of that interaction.

Since simulations are *operating* models of some system of interest, they necessarily contain a time component. To the degree to which time can be introduced into the simulation at a sufficient length, changes over time, sequences of events and so forth can be studied by the experimenter. This feature of simulations represents a major advantage over other laboratory research techniques. Simulations further allow us to simultaneously control variables external and internal to the system of interest. In addition, we are able to simplify the complex environment of an organization to the degree to which it is experimentally desirable and to introduce experimental variables, no matter what they are, at the level we choose. Finally, simulation allows us to test and evaluate system performance economically during exploratory and developmental stages of a system. In other words, we are likely to learn about the advantages or disadvantages of the system before it is actually put into operation and before damage or loss from improper functioning of the system can produce problems.

Of course, one might argue in favor of the use of simulation not only for the sake of a better understanding of the organization, but also for the sake of better theoretical development. Evan (1971) and Zelditch and Evan (1962) suggested that theoretical development should begin by designing simulations which are very complex and include as many organizational variables and functions as possible. They stated:

> "In the present state of theory, we require simulations close to the upper bound of richness, the upper bound being dictated by the desire to isolate and manipulate theoretically significant variables without undue complication."

These authors believe that theoretical development would proceed better from the more complex to the more simple; i.e., when we understand more about the theoretical relationships between organizational variables, we should be able to develop simulations which are simpler and where relationships could be more precisely defined. Other authors have suggested utilizing simulations beginning with simpler variable interactions to "construct" an organizational system (c.f., Fromkin and Streufert, 1976).

Problems of Simulations

The previous discussion may make it appear to the uninitiated reader that simulations can be considered the ideal method for organizational research. Unfortunately, the researcher deciding to simulate organizational systems would encounter a number of serious problems as well. While some methodological difficulties of simulations are shared with other research methods, several problems are inherent in the use of simulation techniques (Tallman and Wilson, 1974). The cost of developing and operating simulation techniques of considerable fidelity, the staffing requirements, the lab or computer space and cost (c.f., Barton, 1972) tend to result in relatively high initial costs.*

---

*It should be noted, however, that a reduction in cost by reducing the fidelity of a simulation may not always result in data of lower quality, even though participants may object to the "inadequate" simulation environment (Granda, 1976).

More troublesome are other issues, however. Simulations are not real organizations and as such may lose some of the fidelity of research that would have been carried out in real organizations. On the other hand, simulations do not quite duplicate the precision of the small-scale laboratory equipment (e.g., Wagner and Palola, 1964). In other words, simulations represent a compromise which has both advantages and disadvantages. While experimental control is maintained in a manageable size environment, some of the control that would have been available in a small-scale lab experiment is lost. While a system is represented with hopefully most or all important characteristics and variables intact, some important variables or characteristics may have been overlooked by the experimenter (c.f., Fromkin and Streufert, 1976). To put it another way, simulation may well be the ideal form of experimentation whenever we need to cope with less than ideal conditions for collecting experimental data on organizational functioning.

F. SIMULATION TYPES AND RELATED METHODOLOGIES

Simulations were first developed in the physical and engineering sciences. Aircraft design engineers, for example, might place an operating model of a future airplane within a wind tunnel to determine the flight characteristics of that aircraft. Such a procedure would allow identification of potential problem areas and improvement of airframe design. Some 25 years ago, behavioral scientists discovered the value of simulation for the behavioral, social, political and organizational sciences (e.g., Guetzkow, 1962; McGrath, 1964). These researchers suggested that an operating model of a social organization could be built and tested in the same fashion in which aircraft engineers test the design of a fuselage or wing structure. More recently, simulation techniques have been developed for a wide variety of purposes. A number of these techniques are discussed briefly below. A short discussion of related techniques that have at times been inappropriately included in the category of simulation is added primarily to point out their indadequacies as research methods for complex organizational systems.

Free Simulations

Fromkin and Streufert (1976) have termed the simulation techniques developed by Guetzkow and associates "free" simulations. In free simulation techniques, participants are free to choose their own courses of action (within the constraints of their resources and the limitations of given rules). More importantly, they also are free to modify their environment through their own actions over time. The result of such activity is a simulated organizational process in which groups, teams or organizations that operate as participants in a simulation, produce different temporal changes in their environments.

Free simulations have been used for a large number of purposes (c.f., Inbar and Stoll, 1972; Shubik, 1960). Whether this technique is utilized as a business game (Bass, 1964), to measure international conflict effects (Driver, 1962), as a learning experience (Cabell, 1974), or to study management functions (Lucas, 1979), (to mention only a few applications) it has served many researchers very well. Many who have worked extensively with this technique view free simulation abstractly or as a model of reality. In such a view, free simulation becomes a "theory" containing various levels of complexity, some of which may be beyond human comprehension. The relationships between variables in a simulation are expressed in parameter statements which determine how actions of a particular group in a simulation may produce outcomes in interaction with other opposing or cooperating groups. In other words, such a simulation progresses on the basis of interactions among multiple variables.

If many a proponent of free simulation is criticized because, for example, a complex interaction in the simulation is not comprehensible, the proponent may respond by saying that it is not of interest to understand how the variables in the simulation interact, but rather to develop an operating model which perfectly parallels reality. When early researchers associated with Guetzkow and the Hermanns were able to simulate the First World War in a laboratory setting, for example, the parameters and scenarios utilized for the simulation could be viewed as a "theory" of political and military history during the period from 1900 to 1920 (Hermann, 1969; Hermann and Hermann, 1963).

One primary purpose of free simulation theory is to develop a method which could predict future military encounters or other organizational events equally as well as it reproduces previous (or historical) encounters. In such a process, the participation of actual persons in the simulation may, at some point in the model development, be considered unnecessary because human participants may be replaced by theoretical parameter relationships. Accuracy of parameter assumptions is, of course, uncertain but may be improved by successive approximation of simulation results to real-world events. The predictive (and "face") validity of such a free simulation model at some stage of development is thus questionable. Whether free simulation theory (modeling) can ever achieve wide predictive applicability remains a contested issue between advocates and detractors of free simulation techniques. We will deal with this issue in greater detail in the subsequent section on the use of modeling and computer simulations.

Aside from their possible value as theoretical models of reality, free simulations have also been employed for both experimental and training purposes. The early work of Michael Driver, utilizing Guetzkow's Inter-National System (INS) simulation, for example, has attempted to show how stress in a simulated environment may affect the dimensionality of international decision makers (Driver, 1962). Driver, for example, demonstrated that differentiation and integration in military decision making are strongly influenced by both environmental stress and by the complexity characteristics of the involved decision makers. Precise relationships between stress and military decision making behavior were not obtained in Driver's research, however - partially because his efforts were limited by the characteristics of the free simulation techniques he employed. Since participants in free simulations are able to modify their own environment over time, the experimenter is not able to induce certain controlled independent variable characteristics (in this case, specific stress levels over time). Driver had to wait until appropriate stress levels occurred "naturally" in the simulated setting in order to assess their effects. As a result, few, if any, causality inferences can be postulated on the basis of such research.

Shubik and Brewer (1972) have expressed the advantages and disadvantages of the free simulation ("free game" in their terminology) for experimental purposes quite well when they stated:

> "The free form game is characterized by a scenario that provides a context within which play is developed...A key feature of the free form game is that positions, objects and rules are challenged, created and improved as the game proceeds...imagination and innovation play an important role. The exercise may be regarded as a type of brainstorming or interaction that enables individuals to see features of a problem not necessarily contained in the scenario. The quality of such exercises obviously depends upon the initial condition and the nature of the referee or control. How good is the scenario? How valid and inspired is the guidance of the control team, the referees and other contributing experts?"
>
> "In terms of what a free form exercise produces, there are two intimately related arguments that appear, but actually are not, mutually contradictory. Free form games, it is argued, are non-scientific because they are not replicable and because they generate nothing that yields tangible research results. Analysis is not possible during play because the momentum of the game and the wishes of control override a researcher's desire to stop, speed up or slow down activities for his own purposes. Measurement destroys or at least contaminates the thing being measured."
>
> "On the other hand, those who have the necessary monitoring and recording equipment, lament that *too much* information for postgame analysis is *produced* and that there are few effective means to manage and analyze it. The issue seems to hinge on the identification of reasonable, interesting and manageable units of observation...These two points of view hint that tangible research results can well be obtained from free form games if one is able to figure out effective data management, reduction and analysis procedures. The potential exists but we have not yet tapped it."

Effective management of simulation methodology and data collection is obtained by modifying free simulations to maintain experimental control, particularly by adding control in the time dimension. Some researchers have added partial time controls to their free simulation efforts (e.g., McCall and Lombardo, 1978, who utilize a technique under the name "Looking Glass, Inc." in which some control over information reaching participants over time is feasible. Similar efforts were also reported by Nagasawa, 1970). More complete control over the time dimension has been achieved by the experimental simulation technique (c.f., Fromkin and Streufert, 1976).

Experimental Simulation Methods

McGrath (1964, 1966) has emphasized the importance of simulation for experimental purposes. In his 1966 paper, he stated:

> "By experimental simulation, we mean those studies which attempt to recreate or simulate the central features of some set of phenomena which are of interest and then to study those phenomena under relatively controlled conditions...The laboratory study is deliberately artificial in the sense that a physicist is artificial when he studies bodies falling in a vacuum. The experimental simulation, on the other hand, tries to create much of the 'realness' and 'flavor' of the 'real-life phenomena' themselves; thereby the researcher hopes to gain the advantages of real motivation and the operation and interaction of many relevant variables."

In other words, experimental simulations as defined by McGrath are:

> "Empirical investigations which attempt to create a relatively faithful representation of an organization under quasi-laboratory conditions, set that simulated organization into motion and study the operation of that organization as it is expressed in the behavior of humans who are assigned roles within it."

McGrath further argued that:

> "Experimental simulations provide a most effective setting since they offer an optimal balance of comprehensiveness and efficiency." (McGrath, 1966)

Those "experimental simulations" which in the earlier years of organizational psychology followed the recommendations of McGrath tended to operationalize their independent variable by creating differential starting points for different groups of participants that were placed into the simulation. To obtain experimental control over independent variables across time, as well, Streufert et al. (1965) and, in a separate effort, Drabeck (e.g., Drabeck and Haas, 1967) developed experimental simulation techniques which incorporated control over the time variable. Participants placed in this form of simulation believe that they are interacting with an ongoing environment and that their own actions, behaviors and decisions affect that environment in turn. In other words, they believe that the outcomes to which they themselves are exposed in the future are in part direct effects of their own previous activities. In fact, however, experimental simulations utilize an environment which is under complete control of the experimenter. The experimenter may select one or more independent variables. He or she manipulates these variables over time according to the design of the research. The events to which participants are exposed reflect the operations of independent variable manipulations, not of participant behavior. If experimental simulations are well designed, the participant will never realize that his or her behavior is without direct effect on future outcomes.

Obviously, this technique has greater advantages for the experimenter who wishes to measure the effects of a number of widely controlled variables in complex, real-world-like environments. The technique has proven itself invaluable in many experiments in a number of organizational settings and has produced useful data for the theoretical researcher and for the applier within real organizations. (See, for example, the research of Streufert and Schroder, 1965; Streufert, Suedfeld and Driver, 1965; Streufert, 1970a and 1970b).

Differential Forms of Experimental Simulations

Klimoski (1978)* has suggested that experimental simulations be subdivided into a number of categories. He described the kind of simulation favored by McGrath (1966) as enactment simulation. Here individuals with different viewpoints, values or objectives may be brought together to reach agreement on some currently important or volatile issue. Participants are told that they must reach agreement. Experimental control can be maintained over the beginning point of the simulation and many replications are possible.

A second type of experimental simulation identified by Klimoski is the "strategic simulation." Klimoski suggested that:

> "Strategic simulations do not take advantage of real or continuous group differences, but instead collect individuals in ad hoc groups and attempt to create differences...Having invested a good deal of energy, the subjects become identified with their product. The solution becomes linked to the group, its identity and the self-image of its members. Thus, when confronted with another group and its answers which are inevitably different, the intergroup behavior of subjects parallels that of ongoing long-lived groups."

Klimoski identified a third simulation category as "role-playing simulation." Here individuals and groups are to assume the role of another person or another group and are asked to act appropriately to that role: i.e., to behave as the other person or the other group might behave. Subjects typically are to respond in their role behavior to a situation that has been defined by the experimenter.

Neither of the simulation categories which were defined as "experimental simulations" by Klimoski would likely be considered experimental simulations by such writers as Streufert et al. (1965), Drabeck et al. (1971), or Fromkin and Streufert (1976). Particularly the role-playing category seems quite inappropriate to experimental simulation technology. (We will deal with role playing in greater detail below). Drabeck and associates and Streufert and associates would consider an experimental simulation technique to be a method where participants are exposed to a pre-programmed environment over time, an environment which they believe is responsive to their actions. In other words, both the differential beginning points and the time based manipulations would respond to independent variable requirements. As Streufert and Suedfeld (1977) have recently pointed out, operation over time is essential to define a research method or simulation, and control over time is essential for qualification of the method as experimental (as opposed to free) simulation. This definition would eliminate role playing and paper and pencil experiments (the so-called jury simulations) from the experimental simulation category. It would on the other hand, consider Driver and Hunsaker's (1972) (also Hunsaker and Hunsaker, 1974) Luna Colony Simulation, Sung and Castore's (1978) decision making task and Hunsaker's (1978) adaptation of Streufert et al.'s (1965) Tactical and Negotiations Game as potential experimental simulations, since they can be operated with control over the time dimension.

---

* Note that Klimoski is viewing simulation from the vantage point of a researcher concerned with negotiation and communication.

Another form of experimental simulation technique has recently been suggested by Streufert and Swezey (1980). This technology is based on previous research by Streufert et al. with the Tactical and Negotiations Game for the Office of Naval Research. Streufert and Swezey suggest that it is possible to design a quasi-experimental simulation which combines the desirable effects of free simulations with those of experimental simulation techniques. Basically, such a method would provide participants with some direct feedback based upon their previous actions. However, it would also allow retention of experimental control over relevant experimental variables. Such a technique thus borrows control of independent variable manipulation over time from experimental simulation methodology, but applies that control only to variables which are of specific interest in an experiment. Other variables which may be held constant, randomized or eliminated in experimental simulations can be freed to vary "realistically" as a function of actions of participants and of established parameters.

The conceptualizations on which quasi-experimental simulation technology are based are quite similar to the thoughts on which Campbell and Stanley (1963) base their quasi-experimental research design paradigms. If a setting of interest to the researcher is too complex to fit within the rather rigid and restrictive requirements of standard experimental simulation technology, quasi-experimental methods may be used to allow the setting to remain more "natural" yet to gain necessary control over important components of that setting and, thus, to allow inference of causality in predicting dependent variable data from independent variable events or manipulations. Quasi-experimentation is, then, a compromise between the limitations imposed by working with real-world phenomena and the desire to obtain meaningful and reliable data. The experimenter, using quasi-experimental simulation technology, can, of course, select specific variables to be manipulated as well as others that are left to vary freely with the actions of participant subjects. Obviously, the independent variables must remain under experimenter control. Those variables that are likely to interact with the independent variable should also be controlled. To the degree to which control can be extended to additional environmental and systematic characteristics in the simulation, the advantages of experimental simulation methodology in the narrow sense are approached and the problems associated with free simulations are reduced. To the degree to which control is relaxed, realism may be increased, but some potential confounding problems might emerge.

Some Problems Encountered with Experimental Simulations

Many of the problems experienced by researchers working with experimental simulations are the same problems that are common in other fields of studies and in other laboratory experiments (c.f., Scott, 1965; Weick, 1965). The majority of the criticisms listed by earlier authors, e.g., unrepresentativeness, lack of involvement by participants, etc., have been resolved (c.f., Fromkin and Streufert, 1976). Nonetheless, some problems remain.

Earlier in this paper, we stated that any simulation must be a compromise. This characteristic holds, of course, for experimental simulations as well. There are, in addition, two problems which are more or less specific to experimental simulation techniques. First, experimental simulations are completely or widely preprogrammed in the information they present to participants. This preprogramming, if done with extreme care and with sufficient pretesting, can make the information reaching the participants appear realistic. The degree of success in obtaining realism is however highly dependent on the relevant experience of the experimenter and on his or her willingness to spend considerable time and effort in pretesting the simulation. Of course, the less the experimental simulation approaches a quasi-experimental simulation, i.e., the closer it comes to total and verbatim programming, the more difficult this problem becomes and the more effort is necessary to resolve it.

The second problem of experimental simulations derives in effect from an advantage these techniques have. Experimental simulations, even though expensive to design and operate, tend to be relatively inexpensive per unit of data collected. While up to three or four independent variables may be used simultaneously (superimposed or interactively manipulated), a very large number of dependent variables can be collected at the same time. It will be obvious to the experienced researcher that several dependent variables in the same experiment cannot be independent of each other and that all of them could be affected by the same effects. In other words, as Holmes has stated:*

> "Continuous nature of simulation, although highly desirable because of its realism producing effects, works against the possibility of computing measures of reliability."

Fromkin and Streufert (1976) have suggested some solutions to problems of this kind. By replicating certain independent and dependent variables in subsequent experimental simulations runs, the reliability of experimental findings can be ascertained or at least estimated.

Computer Simulations and Model Building

To some degree any simulation, no matter whether it is run entirely on the computer, whether it operates in a man-machine interaction, or whether it is staffed only with participants, represents some kind of model. Even the environment to which participants in an all-man simulation may be exposed, and the instructions they receive (i.e., the rules under which the simulation takes place) must represent some abstraction from reality. This abstraction follows the conceptualizations of the experimenter (or trainer, etc.) of what certain systemic characteristics are, how they are affected by participant actions, how they interact with each other and so forth. Without such minimal models, no simulation could function. They represent all or part of the scenario.

---

* Unpublished manuscript.

In this section, we will not be concerned with scenario models for manned or man-machine simulations, but will focus primarily on the theoretical and mathematical models which simulation researchers have designed to interpret previous real-world events, to explain and analyze current events, and to predict from a theoretical basis what might happen in the future. Typically, these models operate without participants and are based on parameter assumptions of the experimenter or modeler.

Simulation researchers who are concerned with computer simulations (e.g., Greenblat and Uretsky, 1977) suggest that all abstractions are a kind of model (Schultz, 1974) and that several model types exist. The most familiar form is the verbal model which we encounter on a daily basis in oral and written communications. The verbal model may be modified by communication aides; for example, it might include statements that are presented in graphic or similar form.

More sophisticated is a theoretical statement presented in symbolic language, i.e., the mathematical model. The use of a mathematical model generally implies the ability to define independent and dependent variables, existing relationships, and to specify possible or permissible values.

Lastly, there is the physical model as used by architects, urban planners, etc. According to Greenblat and Uretsky (1977), all these models share one limitation: they demonstrate the structure of a reference system, but they cannot display the functions of a dynamic process within the system. In other words, they are static. In contrast, computer simulations are operating models, i.e., they are affected by the lawful effects of time.

Greenblat and Uretsky further stated that:

> "All model building then entails abstraction and representation from a larger reference system. Central features must be identified and simplified while less important elements are omitted. There is, thus, an implicit recognition by the model builder that selection must be made among charac-

> teristics. The final product will not possess all the characteristics and complexity of real form, as the purpose is to create a scaled-down version that is more amenable to analysis or more effective for teaching. In the simulation, in addition, the parts must be assembled so that they operate in a manner similar to the real-world system."
>
> "...(Computer simulations) are frequently and effectively used as a mechanism for developing theory. In this sense, the designer does not start with a theory and then try to develop a model that conforms with the theory. Instead, one begins with a set of phenomena, and tries to design a model (or series of models) that will conform to the phenomena in every important respect. Results from the execution of these simulations are then checked for empirical validity and face validity...Discrepancies are generally found to indicate that the observer had an improper understanding of some aspect of the system being modeled." (Greenblat and Uretsky, 1977).

Modeling via computer simulation, in other words, is an attempt at successive approximations toward a system of interest. The quality of the model must depend on the parameters specified and the knowledge about or correctness of the assumptions about interactions among all relevant parameters. If the assumptions are indeed correct, the computerized simulation model can have vast predictive usefulness. To quote McLeod (1974):

> "...simulations...together with other techniques... can serve as a more dependent planning tool than any other technique we now have available."

Yet, computer simulation for model building purposes has often been described as both an art and a science (e.g., Mihram, 1976), and the quality and insightfulness of the "artist" must necessarily affect the outcome.

Certain systematic problems appear particularly useful for modeling. As Fromkin and Streufert (1976) have pointed out, the human mind cannot understand the complex interactions among a multitude of variables which are active in many complex organizations. The analytic scientist may wish to reduce the number of variables to a manageable few, but he may lose the essence of the system he is trying to understand. Reductionism has not been attacked so widely by practitioners without good reason. Attempting to understand the system as a whole as well as can be achieved may well be the ideal task for the computer simulation modeler.

> "...the best use of (computer) simulation occurs when the phenomenon addressed (not discarded or ignored) is not readily amenable to analytic formulation. For such phenomena...(computer) simulation is the agreed upon modus operandi for scientific inquiry." (Tuggle, 1978).

Yet even in computer simulations, some variables must be excluded. Not all parameters and parameter interactions known are calculatable from other parameters and their interactions. For that matter:

> "If all interactions were taken into account, the development of a model of even the simplest system would grow into a model of the world - if not the universe. Fortunately, practical considerations can be served without sacrificing the usefulness of the model...So, we make simplifying assumptions. This is not only permissable, but necessary. However, determination of what assumptions should be made is both the most important - and the most difficult - job that a modeler must undertake." (McLeod, 1974)

and,

> "...the aim (of computer models) is not to mirror in detail the actual functioning of a social system...instead...to program into the computer certain theoretical processes and then to see what kind of behavior they generate. The aim is to put together certain processes at the individual and interpersonal level...and then to see what consequences they have at the level of the larger system (Coleman, 1961, c.f., also Ruggiero, 1977, Tuggle, 1978.)"

Obviously, whether or not some component of the system of interest can be eliminated from consideration would have to depend: 1) on its own direct effects upon or within the system, and 2) on the level to which it tends to interact with other systemic variables. If its effects are clearly negligible (for some specific analysis), then it may be ignored. McLeod (1974) suggested a specific method for determining the importance of potential system components for inclusion in computer simulation models:

> "If the modeler checks the dynamics of his model by noting the reaction with, and then without, invoking the simplifying assumption in question, and the only difference in the simulation outputs is down near the noise level, then the simplifying assumption is certainly justified."

Certainly simplification of the model is of value if it is to be manageable. On the other hand, fidelity of the model would suggest that it approach the system to be modeled in all important aspects. Where should one draw the line? Tuggle (1978) has written extensively about this particular problem. In his view,

> "Explanatory power is shown to be an increasing function of theory content, and explanatory yield is shown to be a decreasing function of theory content."

The choice of the degree of detail from the original system that is to be included in the model would have to depend on the necessity for obtaining a particular degree of explanatory power as a function of cost per unit of explanatory yield.

Once a model of a particular size system has been developed, it can be be tested via the Monte Carlo method. The classical Monte Carlo simulation approach characterizes the environment by a probabilistic model with judgmentally preassigned structure and parameters. Any one specific trial can then be generated by the Monte Carlo method. A set of such trials represents a random sample producing a random probability distribution of outcomes based on the model. This outcome set can be conceived as an estimate of the functioning of the model under the conditions which the data levels introduced into the simulation represented. Repeated runs of the model at divergent input levels would allow for comparative system functioning estimates (some of which may be compared with the "real" system that is being represented by the model, assuming the real system has experienced equivalent input levels).

Several writers have expressed deep concern whether such modeling approaches and Monte Carlo techniques can work.

Brown and Watson (1977), for example, have stated:

> "To obtain an adequate representation of an extremely complex environment (such as that of a military engagement) requires a massive modeling effort, yet it is not clear that any feasible amount of effort would be able to produce a prestructured environment that captures the essential features of the actual environment."

Other writers would agree with such a doubtful posture (e.g., Rousser and Johnson, 1975; Fromkin and Streufert, 1976).

Some additional doubt has been thrown on the use of computer models because of the difficulty of matching data obtained from field observation, from manned simulation techniques or from experiments with the results of computer models of the same processes (e.g., Hare, 1970; Hart and Sung, 1976). Of course it is not certain whether the differences among these methods are due to "error" in human behavior, or whether they are due to poor representation of human or other system behavior via the models. There are certainly a large number of researchers who are confident enough in computer models to utilize them for the analysis of quite diverse problems (for example: decision making, Aitchison and Moore, 1976; action analysis, Seltzer, 1973; audience behavior, Lashbrook, 1971, Lashbrook and Sullivan, 1973; and extreme conflict, Cole, Phillips and Hartman, 1977, to name just a few). In addition, a number of writers have argued cogently for the usefulness of computer models for applications to problems of real systems, varying from the behavior of small groups on one side to international conflict on the other (Gillespie and Zinnes, 1977). Nonetheless, as we have discussed above, this enthusiasm and confidence is not shared by a number of writers.

What are the alternatives? Brown and Watson (1977) suggested that the use of modeling via computers at a less complex level may be combined with the use of manned simulation techniques:

> "Here some or all of the environmental response to the stimulus (decision aiding system) is generated by military experts who serve as an environmental 'surrogate' for such factors as enemy reaction, or whether that might affect

> the performance of the system. Contingencies do not, therefore, have to be anticipated ahead of the exercise, as in Monte Carlo simulations. A sophisticated form of war game can be obtained with the use of the step-through simulation approach, where probability distributions (rather than single responses) are supplied by the environmental surrogates as called for, and then they are randomly sampled. The output of step-through is indistinguishable from Monte Carlo. However, like other types of war gaming, it is cheaper and less liable to incorrect structure than conventional (computer) simulation and thus appears more appropriate in general for present purposes." (Brown and Watson, 1977).

To summarize, computer simulation models appear to be a needed, but as of yet insufficiently developed, approach for the analysis and prediction of the functioning of complex systems. There is considerable disagreement between those who utilize computer models and those who express doubts about them. At the present time, it appears wise to the present authors to either allow more time for the development of better computer modeling techniques or to at least combine computer models with manned simulations for comparison.

Man-machine Simulations

As we have seen, computer simulations of systemic behavior tend to operate only on the computer (with some exceptions). The human component in those simulations is typically automated via parameter assumptions as well. In contrast, man-machine simulations employ both human participants and computers. This form of simulation may either utilize the computer in an auxiliary function (for example, in a simulation of an organization the computer may represent some unmanned subsystem) or the computer may play the part of an opponent (either according to some preplanned experimental strategy or with responses that are calculated on the basis of actions taken by the manned component in the simulation).

In other words, in man-machine simulations the computer fulfills part of the systemic requirements while other parts are fulfilled by human participants. Typically, the parameters for the computer components of the man-machine simulation are fixed, although in a few of these simulations they may be overridden or permanently modified by participants (e.g., Eliason, 1973).

Man-machine simulations have the same wide potential for application as do free and experimental simulations. They may be utilized to measure and predict an individual's effects on the organization (e.g., Jones and Jones, 1978) as well as the effects of organizational subsystems (e.g., Robins, Buffardi and Ryan, 1974). Man-machine simulations may be planned as either free or as experimental simulations. In another application of computer technology, the computer may replace one partner (or opponent) in experimental games (see the discussion of games below). Most of the advantages of such man-machine methodologies parallel those of the most similar simulation or gaming method and consequently need not be discussed in detail in this section.

Games

The attempt to use games to predict organizational behavior was extremely popular in the time period centering around the 1960s. While most of the impetus for the use of game models of organizational behavior came from social and quantitative psychology, some organizational psychologists have attempted to model system behavior via games as well (c.f., Fromkin and Streufert, 1976). Games are techniques where specific and limiting rules are provided, and players usually have very few alternatives for use in responding to the action of other players. As such, games tend to be simplifications of real-world events. Games (by the definitions provided in this paper) may be either "free" or "experimental." Thus, game players may operate either against a predetermined or fixed program, or against a responsive program or opponent who is present in person. While games may be useful in certain constrained alternate choice situations, their general utility in organizational psychology is extremely limited.

Shubik (1970) (discussing the Prisoner's Dilemma Game) has clearly stated the problems of games:

> "(The game's) simplicity makes it most attractive as a paradigm to explain human behavior. Furthermore, it is easy to experiment with. The very simplicity of this game is a danger. Analogies between it and human affairs are best employed to study their inadequacies and to pinpoint what has been left out, rather than to claim how much of the world can be packed into a 2 x 2 matrix."

Indeed, more complex (and adequate) games have been developed since the early work of the Prisoner's Dilemma Game. But even the more complex games are inadequate by comparison to simulation techniques proper, and probably should not be considered in the same category. As games become more and more complex (and more adequate) they begin to resemble research methodologies that are better defined as simulations rather than as games. Such methods are discussed under simulation headings. It would, consequently, be inappropriate to consider gaming technology at length in this paper.

Role Playing

Some writers have suggested role playing as an alternative to simulation or have not distinguished between role playing and simulations (and games) as a basis for organizational research methods (e.g., Crano and Brewer, 1972).

In role playing tasks, a person or group of persons imagine themselves to be in the role(s) of others, and try to behave in the fashion they think these people would behave. Early investigations of role playing (comparison research between role playing and other techniques) has shown that role playing can reproduce main effects that are obtained both in experimental simulations and in post hoc analysis of real-world events. However, role playing technqiues rarely, if ever, demonstrate the complex interactive effects that other research techniques or real-world-based observations can produce. Role playing, thus, is useful only in very simple settings and is, therefore, probably not applicable to research with complex organizational systems.

In-basket Techniques

In-basket techniques (see Finkle, 1976) can be compared to simplified versions of free simulations where participants respond to incoming information (i.e., problems) which are presented by an experimenter. The participant is typically asked to make "appropriate" responses or decisions within specific rules and environmental constraints. In-basket techniques may be useful for research in organizational subsystems (e.g., Shapira and Dunbar, 1980), if relatively simple decision or response tasks are required. These methods are, however, much less useful as the setting and the task requirements of any system become more complex. Consequently, they will not be considered further in this paper.

G. SIMULATIONS AND TRAINING

Thus far in this review, we have been concerned with organizational simulation techniques for the purpose of research, including model building and theory construction. Another major use of simulation in organizational psychology has not yet been considered in detail: the use of simulation for training purposes (c.f., the review by Ruggiero, 1977 and the discussion of dimensions of simulation by Crawford, 1966). We shall again refer to McCluskey (1973) who wrote:

> "Simulation provides an excellent environment for training personnel to function effectively in a system. Many of the variables in the learning environment may be controlled and measured by the instructor so that he may make adjustments in the programs to meet the individual needs of trainees. In addition, the simulated situation will provide the trainee with immediate knowledge of results without the detrimental consequences of incorrect actions in the real world."

Obviously, there are considerable advantages to using simulation techniques for training. Participants in the simulation not only receive feedback whether their actions were correct or incorrect, they also obtain first-hand experience with the functioning system -- making their experiences more "real" and probably allowing them to better remember the direct relationships between their actions and the relevant outcome. The potential for training in a wide range of tasks is given. Training in a simulation has been used in such disparate areas as consumer credit (Anderson, 1970), American history (Baker, 1968), management of community mental health centers (Hallenbeck, Gallaher and Warren, 1977), political perceptions (Livingston, 1972; Livingston and Kidder, 1973) and economics (Wing, 1966), not to speak of the extensive use of training simulations in the military sector. As Ruben (1977) puts it:

> "As has been noted on numerous occasions in the literature...simulations...have numerous strengths at face value at least. They are generally constructed with a problem focus, and as a result, they successfully motivate participants. They facilitate questioning, inquiry and structural learning in addition to teaching specific content. Also...real-world time and space constraints can be minimized or eliminated. Participants need not wait days, months or years to gain some sense of the consequences of their decisions and actions."
>
> "Experimental techniques also seem particularly useful for helping participants understand and learn to cope directly with the complexities of personal and social change and the ambiguity which accompanies these processes...Risks, responsibilities, and severity of outcomes can be controlled, making it possible to fail without experiencing the full consequences... Simulations...can be an important aid for learning about the functions of rules and social systems, their universality, their fairness, their enforceability, the means of enforcement available and their justification."

There are few who would question whether training via simulation techniques is possible. Yet it must be remembered that simulations are not inexpensive. Consequently we should raise the question as to whether simulation is a cost-effective means of transmitting knowledge to organizational personnel. In standard classroom instruction, if film materials and so forth would have the identical effects as simulation participation, then the use of simulation techniques is probably unnecessary.

A number of researchers have attempted to establish the respective value of simulation in contrast to other techniques for training purposes (e.g., Chartier, 1972; Druckman, 1971; Fennessey, Livingston, Edwards, Kidder and Nafziger, 1975, Lester and Stoil, 1979; Weitz and Adler, 1973). While a few researchers have obtained greater performance improvement scores via the use of simulations (e.g., Wolf, 1973), most researchers report equivalent improvement for simulation participants and for persons trained by conventional methods (e.g., Chartier, 1972; Lester and Stoil, 1979) or via films and discussions (Fennessey et al., 1975). A reliable finding, however, is the greater satisfaction which simulation participants express after the training is completed. The data of Weitz and Adler (1973) would suggest that the failure to find better improvement scores for persons trained in a simulation may be more useful than other methods since it provides an "ecology of discovery" above and beyond any development of systematic knowledge (Druckman, 1971).

At the present time, then, we cannot argue strongly for the use of simulation in training when the only purpose of training is the transmission of specific knowledge to the trainee. In contrast, when a more general orientation is to be learned, training via simulation methods is likely quite useful.

Free vs. Experimental Methods in Training Simulations

Most existing training simulations tend to lean toward a free simulation approach. Training simulation participants are typically exposed to an environment which requires an action or reaction on their part. The feedback received by participants following an action tends to provide positive or negative reinforcement, indicating whether an action (or reaction) was or was not appropriate. In more complicated cases, of course, the feedback received may be indirect, may require interpretation or may be due to the interaction of several activities in which the simulation participants have engaged. Let us consider, for example, training personnel in a battle simulation task. Decisions made by participants have effects which would feed into subsequent events. These events, themselves, also require responses. For such an iterative process, free simulation techniques are, of course, ideal. For training to be effective, however, participants must be able to understand the effects of their actions as they relate to subsequent sequences of events (e.g., enemy reactions, etc.). For example, a participant must understand why action X, performed at an early point in time, may have a different effect than the same action at a later point in time, i.e., after conditions have changed via subsequent actions Y, Z, etc. The more complex the simulated setting and the greater the numbers of interaction with outside systems, the more difficult it is to communicate and to grasp reasons for differential reinforcements of the same action.

Ruben (1977) has pointed out these problems and some others. He has stated:

> "Against the backdrop of potential and promise, remain a number of persistent and generally unaddressed concerns and criticisms. A number of them focus generally on the trainer, instructor or teacher. All too often, it has been argued that trainers and instructors utilizing games and simulations lack the necessary expertise, familiarity and background. In many cases, users conceive of experimental methods as the panacea for all problems of education. It has been pointed out that largely as a product of the way such activities are used, effective outcomes are more probable than either cognitive or behavioral ones. It is argued that users often devote more attention to broadening their repertoire of activities than to considering when, whether or why to use them."
>
> "Other more basic issues of concern focus on the conceptual and historical underpinnings of the field. Considerable attention has been devoted in experimental learning to considering specific manifestations - games, simulations, structured exercises, the encounter group and other group methods. Considerably less effort has been devoted to developing a general framework which explores similarities between one game and another, between games and simulations, simulations and encounter groups, or simulations and structured exercises. How the design selection and utilization of experimental techniques can be related to particular instruction objectives is also an issue of some concern; and it has been suggested that research is

> needed to explore the extent to which particular experiential activities are capable of facilitating specific sorts of pedagogical outcomes."

While the quality of the trainer and his conceptualization of his work is, of course, dependent on the individual, the group or the organization who is involving the trainer, some of the other problems pointed out by Ruben can be resolved. Experimental simulation techniques eliminate some of these problems. Since the experimenter controls events experienced by the simulation participant over time, he is free to reinforce appropriate behaviors whenever they occur. Such reinforcements need to be limited to specific response categories (i.e., finding the correct solution in a problem-solving task). They may apply equally well to more complex behaviors (e.g., positive reinforcement may be provided when a decision making solution integrates various incoming information when specific action would lead to the optimum outcome according to pre-establised parameters). Thus in an experimental simulation, a trainer has a more direct capability to enforce appropriate or inappropriate participant actions. In this fashion, the experimental simulation appears to be a preferred training tool (c.f., the use of experimental simulations or similar methods by Hunsaker, 1978; Livingston, 1972; and Livingston and Kidder, 1973).

Some limitations, however, also exist with experimental simulation training techniques. To the degree that a simulation requires a range of choices which may produce divergent results, the experimental simulation in a training paradigm may lack some credibility. Similarly, if a training program is aimed at providing a detailed understanding of the flow of events between decisions, outcomes, future decisions, and subsequent outcomes, an experimental simulation may not adequately serve the purpose.

H. UNIQUE REQUIREMENTS OF TRAINING-ORIENTED SIMULATIONS

In other contexts, it has been suggested that training-oriented simulations should have several unique characteristics (Swezey, 1978). First, they must reliably represent a real situation. Here representation is meant to imply that the simulation portrays certain important situations or other characteristics which allow the experimenter to manipulate those portrayed characteristics for training purposes. Second, training-oriented simulations must retain control over their represented characteristics. The central aspect may in some cases define the differences between a simulation and an operational environment. In the operational environment, a situation may often be essentially uncontrolled. The requirement for planned variation is the differentiating characteristic of the simulation. Third, simulations are often designed to deliberately omit certain characteristics of the input into that system. Reasons for the deliberate omission may include several factors:

1. Certain aspects may be considered to be unimportant.
2. Aspects may be omitted because they are considered to be dangerous, prohibitively costly to represent, or because they are otherwise not feasible for the simulation.
3. Characteristics may be omitted in order to eliminate unpredictability.

This, in fact, is often the rationale used to argue for controlling aspects of simulation. Elimination of unpredictable variance by controlling situation variables is an important benefit of experimental simulations over free simulations and operational context.

As has been discussed elsewhere (Biehl, 1966), the fundamental problem in the area of training-oriented simulation is to optimize an equation which includes at least three components: simulation fidelity, transfer of training and cost. Basically, the idea is to create a situation which accurately locates the simulation fidelity level that is appropriate for creating large amounts of transfer from training to job performance at a point where additional training and transfer increments are not justified in terms of added costs. This is the point of diminishing returns where, if simulation fidelity is increased, additional increases and transfer of training are not proportional to the increases in cost.

To summarize, while a large number of the "free" training simulations have accomplished their goals of providing transfer of training from the simulation to the organizational environment and in some cases have even given the trainer the opportunity to learn important facts about the organizational environment (c.f., Druckman, 1971), it appears that the increased use of more experimentally oriented simulations would be extremely helpful in a number of training efforts.

I. ASSESSMENT

Whether or not trained in a simulation setting, the performance of personnel may be assessed by simulation techniques. Often it is difficult, expensive or dangerous to employ the operation of a real system to estimate the performance capacity of a person or of a group (or subsystem) within the operating system itself. For example, if one wishes to study the quality of military decision makers in a battle setting, an assessment in time of peace can best be accomplished in a simulation. Such assessment simulations have been used quite successfully in military and industrial organizations of various kinds (c.f., Olmstead, Cleary, Lackey and Salter, 1976; Olmstead and Elder, 1977, 1978; Shirts, 1974; and Lashutka, 1977).

J. SUMMARY

This section of the report has been concerned with methodology in a systems approach to organizational psychology. It has been argued that simulations and related methods appear most applicable to organizational systems. The various methods have been described and their advantages and disadvantages (where applicable) have been pointed out. An abbreviated overview of the advantages and disadvantages of each method is provided in Table 18.

TABLE 18.

THE VALUE OF VARIOUS METHODOLOGIES RELATED TO SIMULATION METHODS FOR ORGANIZATIONAL SYSTEMS.

	Direct Experiments with the System	Observation of the System	Manned Free Simulations	Manned Experimental Simulations	Manned Quasi-Experimental Simulations	In-Basket Techniques	Role Playing	Games	Laboratory Exp.	Computer Simulation for Model Building	Free Training Simulations	Experimental Training Simulations	Simulations for Assessment
Applicability to various systemic levels	++	++	++	++	++	+	0	-	--	++	++	++	++
Relevance Potential	++	++	+	+	+	-	--	-	--	0	+	+	++
Fidelity Potential	++	++	++	+	++	0	-	--	--	NA	++	+	++
Potential Interference with System Functions	--	-	++	++	++	++	++	++	++	++	++	++	++
Operating Rather than Static	++	++	++	++	++	++	+	+	--	++	++	++	++
Explanatory Power	++	0	+	++	++	0	-	-	-	?	NA	NA	NA
Causal Inference Potential	+	--	-	++	+	+	-	-	++	0	NA	NA	NA
Usefulness for Theory Dev. in Org. Psychology	++	+	+	++	++	0	-	0	+	++	NA	NA	NA
Usefulness for Modeling	0	-	+	0	0	0	-	0	+	++	NA	NA	NA
Absence of Large Time Requirements	0	00	0	0	0	+	+	++	++	+	+	+	+
Low Cost	--	-	-	-	-	+	+	+	++	-	0	0	0
High Data Yield	+	0	+	++	++	0	-	0	0	+	NA	NA	NA
Safety	--	0	+	+	+	+	+	+	+	++	+	+	+
Few Ethical or Political Constraints	--	-	++	+	+	+	+	+	-	+	+	+	+
Absence of Error Potential	+	--	0	++	+	+	--	0	-	-	+	+	+

NA = not applicable
++ = very positive
+ = somewhat positive

0 = intermediate
- = somewhate negative
-- = very negative

8. SUMMARY AND RESEARCH NEEDS

The literature reviewed in the previous sections of this report identified organizational characteristics and processes which: (1) can be understood within the framework of systems theory, and (2) are relevant to the effective functioning of an organization and its members. The literature was reviewed in terms of six dimensions of organizational behavior and systems concepts. A brief summary cf the literature for each factor follows:

Factor I: Multidimensional Information Processing

Organizations may be viewed as open systems which interact with their environment via information inputs that are classified, differentiated, and integrated within the organization, and finally returned in the form of outputs. Factor I dealt with various processes inherent in a system's information flow. Complexity theory (and related contingency theories) was discussed in terms of their power to predict outcomes of interactions between the environment and information processing stylistics. Integral to these interactions are the concepts of differentiation and integration, symbiosis, and feedback. Decision-making models, relating information processing and problem-solving, were also considered. Research efforts related to complexity theory and processing demands in organizations have explored mechanisms which influence information processing and decision making; however additional research needs are indicated.

Factor II: Organizational Systems Dynamics

A general overview of systems theory was presented, with emphasis on its potential as a theoretical paradigm. Key concepts at the interface of organizational and systems theories were discussed, including "open vs. closed" systems, subsystems, adaptation, and growth. Several of the concepts discussed under Factor I (e.g., openness, differentiation and integration) were also discussed in Factor II in the context of organizational adaptation, homeostasis and growth. Adaptability is generally regarded as a key organizational function, since it often determines the means of survivability and growth in an ever-changing environment. Experimental literature in this area is sparse, as many constructs are highly theoretical and therefore are not easily operationalized.

Factor III: Organizational Change Technologies

In order to adapt, an organization (system) must have the capability and resources for change. Reflecting the preeminance of this ability in the concerns of organizational theorists and researchers is the plethora of literature on organizational change and development. Literature on this topic was reviewed in terms of theories of change, the change agent, and the change intervention process. Successful organizational change appears to be contingent on: the skills of the change agent, data-based diagnosis of client needs, direct participation of organizational members, commitment to the change process, realistic goal setting (as discussed in depth under Factor VI), and management support. A variety of techniques, which have met with varying degrees of success, have been developed to facilitate organizational change. While experimental research in this area is generally lacking in statistical sophistication and control, the case studies and quasi-experimental research reported tend to support the effectiveness of certain change technologies in developing organizations and their members. Applications of these techniques (e.g., survey feedback, team building, job enrichment) to military organizations show promising results when adapted to the particular characteristics of the military system.

Factor IV: Management Authority/Compliance Characteristics

Both theory and research related to this factor suggest its multidimensional nature. While the underlying theory and research suggest that management authority is an individual organizational behavior variable which has significance to the overall effectiveness of organizations, this review has also emphasized the relationship of managerial authority to organizational coordination and control. Power and its related characteristics, authority and influence, were identified as necessary behaviors in effective organizational systems. Using power and its associated components often leads to non-compliance and/or conflict within organizations. Managerial behavior then requires a different set of roles within the hierarchy to manage conflict before it becomes deliterious to the organizational system.

Factor V: Organizational Coordination and Control

As discussed in the preceding section, coordination and control activities are necessary in every organization. In conjunction with planning and motivating activities, they establish the managerial process. The literature reviewed in Factor V dealt with effects of the environment, organizational structure (centralization/decentralization), and interdependence on control processes at various levels within an organization. Control and coordination, like information processing (Factor I), are key elements in organizational decision making, hierarchical staffing, and environmental adaptation.

Factor VI: Goal Orientation

Theoretical considerations involving goal orientation have addressed a number of interactive dimensions, including needs of both managers and workers, environmental requirements provided by an organization, skills and abilities of personnel, technologies available to the organization, and the funding allocated for implementing an operation. Organizational and individual goal orientation are complex phenomena comprising a variety of input, operational, and output components that are related to societal goals, system goals, product goals, and derived goals. Goals and goal orientation can be approached from several perspectives, including the formally sanctioned long-range view, to the short-run real world approach, to a Management by Objectives (MBO) approach. There have been both positive and negative evaluations of MBO since its inception. While there seems to be a widespread interest in MBO because of its common sense approach and simple formula for implementation, to date, conclusions from a theoretical and empirical perspective are still tentative regarding its effectiveness.

A. METHODOLOGY

Conceiving an organization as a system demands a research methodology that approaches the system (organization) from a complex perspective. Despite the difficulties involved in applying experimental techniques in organizational research, it is preferable to use such methods whenever possible in order to obtain data from which causality can be inferred. A review of the literature on experimental methodology indicated that simulation techniques (experimental and quasi-experimental simulation techniques, in particular) most closely approach the two criteria for organizational research stated above. Advantages and disadvantages of various methodological approaches, including several types of simulations, were duscussed and evaluated. This section provided a theoretical and empirical foundation for developing an organizational test bed, using simulation, as described in the Streufert and Swezey (1980) report cited in the introduction of this volume, as a basis.

B. RESEARCH NEEDS

The literature reviewed in the preceding sections of this report support a number of generalized yet significant research needs. Although these needs may appear to be critical of the state-of-the-art in organizational/systems psychology as well as of the theoretical and empirical work associated with it, they are designed to be both forward looking and germane to the development of an organizational test bed; pointing both to unrealized opportunities and to work yet to be accomplished.

1. Improved methodologies for studying organizational behavior are needed. The vast majority of organizational studies fall into one of three conceptual classes: (1) uncontrolled speculation, (2) simple correlational research, (3) univariate experimental or quasi-experimental studies. A need exists to establish new methods and paradigms for investigating organizational behavior. Such techniques as accumulating ideographic approaches may be one appropriate avenue for investigation.

2. Methods for introducing complexity into organizational research efforts are needed. As indicated in (1) above, improved methodologies are needed in organizational research. These methodologies, however, should be compatible with the requirement to investigate the complex, interactive nature of organizations. Although the techniques involved in organizational simulation research appear promising, additional investigation appears warranted on the topic of identifying methodological techniques which are sufficiently flexible to permit their application in complex instructured situations, yet which are sufficiently precise to allow for reproducible results. The quasi-experimental simulation methodology discussed by Streufert and Swezey (1980) may be one applicable approach.

3. Methods of quantifying and operationalizing both organizational performance variables and systems theoretic constructs are needed. Many organizational and systems theoretic terms are sufficiently ambiguous that extreme difficulty exists in defining their meaning operationally and therefore in expressing their variability in quantifiable terms. Research effort should be addressed to this issue.

4. Research on organizational factors and their impact upon decision making behaviors is needed. The processes by which organizations arrive at decisions to act (or react) vary as widely as do the characteristics which describe the organizations themselves. Numerous complex states and variables

typically impact the situations and contexts in which organizations operate in making decisions. The characteristics of these states and variables need to be better defined, and the degrees of their relative impact upon organizational decisions (as well as the process of decision-making) studied.

5. Improved techniques for providing negative feedback to subordinates are needed.

   A need exists to better understand and find ways to deal with the pervasive tendency for superiors to distort or withhold negative feedback to subordinates. Research on non (or less) threatening mechanisms for communicating negative information, both in performance appraisal and in other situationally specific contexts is needed.

6. Methods for reducing organizational resistance to change are needed.

   Inherent resistance to change appears to be a generic problem in many large (particularly bureaucratic) organizations. Research effort should be devoted to the investigation (and hopefully, development) of techniques which can aid in overcoming this resistance.

7. Research on goal setting behavior and its effects upon organizational performance are needed.

   Effects of concrete vs. abstract goal setting on performance have been studied extensively with individuals, however a need exists to consider the extent to which these (and similar) phenomena impact the performance or organizations; particularly in the areas of organizational decision making and problem solving.

8. Research is needed on improved communication processes in organizations.

   Such areas as listening behavior, improvement of listening skills, etc., and other impacts upon the performance of organizations appears to be a fertile area for research effort.

9. Research is needed on the topic of influence processes in organizations and their effects upon organizational behavior.

The ways in which organizational influence processes impact upon individual, and subsequently upon organizational behaviors, is an area in which additional research effort is warranted.

10. Research on aspects of organizational subgroup autonomy is needed.

Various organizations treat the issue of subgroup autonomy differentially. The extent to which differing levels of subgroup autonomy impact various types and sizes of organizations is an area where research effort may be profitably expended.

11. Research in the area of organizational conflict management and resolution is needed.

Such areas as confrontation, diffusion, conflict avoidance, etc. are topics where research effort is required to identify better methods for managing conflict in various organizational contexts.

REFERENCES

Ackoff, R. L. Systems, organizations, and interdisciplinary research. *General Systems*, 1960, *V*, 1-8.

Ackoff, R. L. Towards a system of systems concepts. *Management Science*, 1971, *17*, 661-671.

Aiken, M., & Hage, J. Organizational interdependence and intra-organization structure. *American Sociological Review,* 1968, *33*, 912-930.

Aiken, M., & Hage, J. The organic organization and innovation. *Sociology*, 1971, *5*, 63-82.

Aitchison, J., & Moore, M. F. The analysis of decision making performance. *British Journal of Mathematical and Statistical Psychology*, 1976, *29*, 53-65.

Alderfer, C. P. *Existence, relatedness, and growth: Human needs in organizational settings.* New York: The Free Press, 1972.

Alderfer, C. P. Change processes in organizations. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*. Chicago: Rand-McNally, 1976.

Alderfer, C. P. Organization development. *Annual Review of Psychology*, 1977, *28*.

Alderfer, C. P., & Brown, L. D. *Learning from changing: An application of open systems theory to organizational diagnosis and change*. New Haven, CT: Yale University for Office of Naval Research, 1973.

Aldrich, H., & Herker, D. Boundary spanning roles and organizational structure. *Academy of Management Review,* 1977, *2*, 217-230.

Allport, G. W. The open system in personality theory. *Journal of Abnormal and Social Psychology*, 1960, *61*, 301-310.

Anderson, C. R. An experiment on behavioral learning in a consumer credit game. *Simulation and Games*, 1970, *1*, 43-54.

Angrist, S. S. Evaluation research: Possibilities and limitations. *Journal of Applied Behavioral Science,* 1975, *11*, 75-91.

Argyris, C. Organization and innovation. Homewood, IL: Irwin-Dorsey, 1965.

Argyris, C. On the future of laboratory education. Journal of Applied Behavioral Science, 1967, 3, 153-182.

Argyris, C. Some unintended consequences of rigorous research. Psychological Bulletin, 1968, 70, 185-197.

Argyris, C. Intervention theory and method. Reading, MA: Addison-Wesley, 1970.

Argyris, C. Management and organization development: The path from Xa to Yb. New York: McGraw-Hill, 1971.

Argyris, C. Personality and organization theory revisited. Administrative Science Quarterly, 1973, 18, 141-167.

Argyris, C. The CEO's behavior. Key to organizational development. Harvard Business Review, 1973, 51, 55-64.

Argyris, C. Theories of action that inhibit individual learning, American Psychologist, 1976, 31, 638-654.

Armenakis, A., & Zmud, R. W. Interpreting the measurement of change in organizational research. Personnel Psychology, 1979, 32, 709-723.

Ashby, W. R. Design for a brain. New York: Wiley, 1960.

Ashkenas, R. N., & Schaffer, R. H. Management training for bottom-line results. Training and Development Journal, 1979, 33, 17-22.

Bachman, J. G., Smith, C. G., & Slesinger, J. A. Control, performance, and satisfaction: An analysis of structural and individual effects. Journal of Personality and Social Psychology, 1966, 4, 127-136.

Baker, E. H. A pre-Civil War simulation for teaching American history. In S. S. Boocock, & E. O. Schild (Eds.), Simulation Games in Learning. Beverly Hills: Sage, 1968.

Bales, R. F. Adaptive and integrative changes as a source of strain in social systems. In P. Hare, E. Borgatta, & R. Bales (Eds.), Small Groups. New York: Knopf, 1965.

Barnes, L. B. Approaches to organizational change. In W. G. Bennis, K. D. Benne, & R. Chin (Eds.), The planning of change. New York: Holt, Rinehart & Winston, 1969.

Bartee, E. M. A holistic view of problem solving, *Management Science*, 1973, *20*, 439-448.

Bartee, E. M., & Cheyunski, F. A methodology for process-oriented organizational diagnosis, *Journal of Applied Behavioral Science*, 1977, *13*, 53-68.

Barton, R. F. Designing simulation laboratories. *Simulation and Games*, 1972, *3*, 219-225.

Bass, B. Experimenting with simulated manufacturing organizations. In S. B. Sells (Ed.), *Stimulus Determinants of Behavior*. New York: Ronald Press, 1963.

Bass, B. M. Business gaming for organizational research. *Management Science*, 1964, *10*, 545-556.

Bass, B. M. *A program of exercises for management and organizational psychology*. Pittsburgh: Management Development Associates, 1966.

Bass, B. M. A systems survey research feedback for management and organizational develoment. *Journal of Applied Behavioral Science*, 1976, *12*, 215-229.

Bass, B. M., Farrow, D. L., Valenzi, E. R., & Solomon, R. J. Management styles associated with organizational, task, personal, and interpersonal contingencies. *Journal of Applied Psychology,* 1975, *60*, 720-729.

Battista, J. R. The holistic paradigm and General System Theory. *General Systems*, 1977, *XXII*, 65-71.

Baudhuin, E. S., Swezey, R. W., Foster, G. D., & Streufert, S. *An empirically derived taxonomy of organizational systems*. McLean, VA: Science Applications, Inc., 1980.

Bavelas, A. Communication patterns in task-oriented groups. *Journal of the Acoustical Society of America*, 1950, *22*, 725-730.

Beckett, J. A. General Systems, a non-science, a non-technique, a non-methodology. *Proceedings of the 1979 North American Meeting of the Society for General Systems Research*, 1979.

Beckhard, R. *Organization development: Strategies and models*. Reading, MA: Addison-Wesley, 1969.

Beckhard, R., & Harris, R. T. *Organizational transitions: Managing complex change*. Reading, MA: Addison-Wesley 1977.

Beer, M. Technology of organizational development. In M. D. Dunnette (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand-McNally, 1976.

Beer, M., & Huse, E. F. A systems approach to organization development. *Journal of Applied Behavioral Science*, 1972, *8*, 79-101.

Benne, K. D., & Birnbaum, M. Principles of changing. In W. G. Bennis, K. D. Benne, & R. Chin (Eds.), *The planning of change*. New York: Holt, Rinehart, and Winston, 1961.

Bennis, W. G. Theory and method in applying behavioral science to planning organizational change. *Journal of Applied Behavioral Science*, 1965, *1*, 337-360.

Bennis, W. G. *Changing organizations: Essays on the development and evolution of human organizations*. New York: McGraw-Hill, 1966.

Bennis, W. G. *Organization development: Its nature, origins, and prospects*. Reading, MA: Addison-Wesley, 1969.

Bennis, W. G. A funny thing happened on the way to the future. *American Psychologist*, 1970, *25*, 595-608.

Bennis, W. G., Benne, K. D., & Chin, R. (Eds.), *The planning of change* (2nd Ed.). New York: Holt, Rinehart and Winston, 1969.

Bennis, W. G., Berlew, D. E., Schein, E. H., & Steele, F. J. *Interpersonal dynamics* (3rd Ed.). Homewood, IL: Irwin-Dorsey, 1973.

Bennis, W. G., & Slater, P. E. *The temporary society*. New York: Harper, 1968.

Bernardin, H. J., & Alvares, K. M. The effects of organizational level on perceptions of role conflict resolution strategy. *Organizational Behavior and Human Performance*, 1975, *14*, 1-9.

Berrien, F. K. Homeostatis in groups. *General Systems*, 1964, *IX*, 205-217.

Berrien, F. K. *General and social systems*. New Brunswick, NJ: Rutgers University Press, 1968.

Berrien, F. K. A general systems approach to human groups, In Milton D. Rubin, ed., *Man in systems*, New York: Gordon and Breach, 1971, 119-137.

Berrien, F. K. A general systems approach to organizations. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*. Chicago: Rand-McNally, 1976.

Bertalanffy, L. von. General System Theory. *General Systems*, 1956, I.

Bertalanffy, L. von. General System Theory: A critical review. *General Systems*, 1962, *VII*, 1-20.

Bertalanffy, L. von. The history and status of General Systems Theory. *Academy of Management Journal*, 1972, *15*, 407-426.

Biehl, W. C. Training programs and devices. In R. M. Gagne (Ed.), *Psychological principles in system development*, New York, Holt, Rinehart and Winston, 1966.

Bieri, J., Atkins, A. L., Briar, S., Leaman, R. L., Miller, H., & Tripodi, T. *Clinical and social judgement: The discrimination of behavioral information.* New York: Wiley, 1966.

Blake, R. R., & Mouton, J. S. The instrumental training lab. In I. R. Weschler, and E. H. Schein (Eds.), *Issues in sensitivity training*. Washington, D. C.: National Training Laboratories, 1962.

Blake, R. R., & Mouton, J. S. Managerial facades. *Advanced Management Journal*, 1966, *31*, 30-38.

Blake, R. R., & Mouton, J. S. *Building a dynamic corporation through grid organizational development*. Reading, MA: Addison-Wesley, 1969.

Blake, R. R., Mouton, J. S., Barnes, L. S., & Greiner, L. E. Breakthrough in organization development. *Harvard Business Review*, 1964, *42*, 133-138.

Blau, P. M., Heyderbrand, W. F., & Stauffer, R. The structure of small bureaucracies. *American Sociological Review*, 1966, *31*, 179-91.

Blau, P. M. A formal theory of differentiation in organizations. *American Sociological Review*, 1970, *35*, 201-219.

Blau, P. M. Centralization in bureaucracies. In M. N. Zald (Ed.), *Power in organizations*. Nashville, TN: Vanderbilt University Press, 1970.

Boland, W. Size, external relations, and the distribution of power: A study of colleges and universities. In V. H. Wolf (Ed.), Comparative organizations. Englewood Cliffs, N. J.: Prentice-Hall, 1973.

Bonini, C. P. Simulation of information and decision systems in the firm. Englewood Cliffs, NJ: Prentice-Hall, 1963.

Bonoma, T. V. Conflict, cooperation and trust in three power systems. Behavioral Science, 1976, 21, 499-514.

Boss, R. W. The effects of leader absence on a confrontation team building design. Journal of Applied Behavioral Science, 1978, 14, 469-478.

Boulding, K. E. General Systems Theory: The skeleton of science. Management Science, 1956, 2, 197-208.

Bowers, D. G. OD techniques and their results in 23 organizations: The Michigan ICL study. Journal of Applied Behavioral Science, 1973, 9, 21-43.

Bowers, D. G., & Hausser, D. L. Work group types and intervention effects in organizational development. Administrative Science Quarterly, 1977, 22, 76-94.

Brady, R. H. MBO goes to work in the public sector. Harvard Business Review, 1973, 51, 65-74.

Brown, L. D. Research action: Organizational feedback, understanding and change. Journal of Applied Behavioral Science, 1972, 8, 697-711.

Brown, R. V., & Watson, S. R. Pretesting innovation: Methodology for testing the design of management systems. Theory and Decision, 1977, 8, 315-336.

Bryan, J. T. & Locke, E. A. Goal setting as a means of increased motivation. Journal of Applied Psychology, 1967, 52, 274-277.

Buchanan, P. Evaluating the effectiveness of laboratory training in industry. NTL Explorations in Human Relations, Washington, D. C. National Training Laboratories, 1965.

Buchanan, P. Crucial issues in OD. In H. A. Hornstein, B. B. Bunker, W. Burke, M. Gindes, & R. Lewicki (Eds.), Social intervention: A behavioral science approach. New York: The Free Press, 1971.

Buckley, W. *Sociology and modern systems theory.* Englewood Cliffs, NJ: Prentice-Hall, 1967.

Buckley, W. Society as a complex adaptive system. In W. Buckley (Ed.), *Modern systems research for the behavioral scientist*. Chicago: Aldine, 1968.

Burke, W. W. Training organization development specialists. *Professional Psychology*, 1970, *1*, 354-358.

Burke, W. W. *Current issues and strategies in organization development*. New York: Human Sciences Press, 1977.

Burns, T., & Stalker, G. M. *The management of innovation*. London: Tavistock, 1961.

Cabell, D. W. E. The relevance of a management game. *Simulation and Games*, 1974, *5*, 201-211.

Cahn, M. M. Organization development in the United States Army: An interview with Lt. Col. Ramon A. Nadal, *Journal of Applied Behavioral Science*, 1978, *14*, 523-536.

Campbell, D. T. Degrees of freedom and the case study. *Comparative Political Studies*, 1975, *8*, 178-194.

Campbell, D. T., & Stanley, J. *Experimental and quasi-experimental designs for research.* Chicago: Rand-McNally, 1963.

Campbell, J. P. Contributions research can make in understanding organizational effectiveness. In S. L. Spray (Ed.), *Organizational effectiveness: Theory-research-utilization.* Kent State: Comparative Administration Research Inst., 1976.

Campbell, J. P., Bownas, D. A., Peterson, N. G., & Dunnette, M. D. *The measurement of organizational effectiveness: A review of relevant research and opinion*. Minneapolis: Personnel Decisions, Inc., 1974.

Campbell, J. P., Dunnette, M. D., Lawler, E. E., & Weick, K. E. *Managerial behavior, performance and effectiveness*. New York: McGraw-Hill, 1970.

Carey, A. The Hawthorne Studies: A radical criticism. *American Sociological Review*, 1967, *32*, 403-416.

Carroll, J., & Tosi, H. L. *Management by objectives: Applications and research*. New York: MacMillan, 1973.

Carroll, S. J., & Tosi, H. L. *Organizational behavior*. Chicago: St. Clair Press, 1977.

Carvalho, G. F. Installing management by objectives: A new perspective on organization change. *Human Resource Management*, 1972.

Castore, C. H., & Streufert, S. The perception of experimentally induced failure. *Psychonomic Science*, 1966, *4*, 137-138.

Chartier, M. R. Learning effect: An experiential study of a simulation game and instrumented discussion. *Simulation and Games*, 1972, *3*, 203-218.

Child, J. Organization structure and strategies of control: A replication of the Aston Study. *Administrative Science Quarterly*, 1972, *17*, 163-77.

Child, J. Predicting and understanding organization structure. *Administrative Science Quarterly*, 1973, *18*, 168-69.

Chin, R. The utility of systems models and developmental models for practitioners. In W. G. Bennis, K. D. Benne, R. Chin (Eds.) *The planning of change.* New York: Holt, Rinehart, and Winston, 1961.

Chin, R. *Models and ideas about changing*. Paper presented at Symposium on Acceptance of New Ideas, University of Nebraska, November 1963.

Chin, R., & Benne, K. General strategies for effecting changes in human systems. In W. G. Bennis, K. D. Benne, & R. Chin (Eds.), *The planning of change*. New York: Holt, Rinehart and Winston, 1969.

Clark, P. A. *Action research and organization change*. New York: Harper and Row, 1972.

Clark, A. W. Action research. In A. G. Cherns, and L. E. Davis (Eds.), *The quality of working life.* New York: Free Press, 1975.

Coch, L., & French, J. R. P., Jr. Overcoming resistance to change. *Human Relations*, 1948, *1*, 513-533.

Cohen, S. L., & Turney, J. R. Intervening at the bottom: Organizational development with enlisted personnel in an Army work-setting. *Personnel Psychology*, 1978, *31*, 715-730.

Cole, S. G., Phillips, J. L., & Hartman, E. A. Test of a model of decision processes in an intense conflict situation. *Behavioral Science*, 1977, *22*, 186-196.

Coleman, J. S. Analysis of social structure and simulation of social processes with electronic computers. *Educational and Psychological Measurement*, 1961, *21*, 203-218.

Connolly, T., Conlon, E. J., & Deutsch, S. J. Organizational effectiveness: A multiple constituency approach. *Academy of Management Review*, 1980, *5*, 211-217.

Cook, D. The impact on managers of frequency of feedback. *Academy of Management Journal*, 1968, *11*, 263-277.

Cook, T. D., & Campbell, D. T. The design and conduct of quasi-experiments and true experiments in field settings. In M. Dunnette (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand-McNally, 1976.

Cowsert, G. T. *Organizational environment and preferences for leadership and power in the officer corps*. Masters thesis. Fort Leavenworth, Kansas: U. S. Army Command and General Staff College, 1974. (NTIS No. ADA043-748).

Crano, W. D., & Brewer, M. P. *Principles of research in social psychology*, New York: McGraw-Hill, 1972.

Crawford, K. S. *Organization development in the Navy: A strategy for addressing disciplinary problems*. (Tech. Rpt. No. NPRDC TR 7738). San Diego, CA: Navy Personnel Research and Development Center, 1977.

Crawford, M. P. Dimensions of simulation. *American Psychologist*, 1966, *21*, 788-796.

Cummings, L. L., O'Connell, M. J., & Huber, G. P. Informational and structural determinants of decision-maker satisfaction. In B. King, S. Streufert, & F. Fiedler, (Eds.), *Managerial control and organizational democracy*. Washington, D. C.: V. H. Winston and Sons, 1978.

Cummings, T. Sociotechnical systems: An intervention strategy. In W. Burke (Ed.), *Current issues and strategies in organization development*. New York: Human Science Press, 1976.

Cummings, T. G., Molloy, E. S., & Glen, R. A methodological critique of fifty-eight selected work experiments. *Human Relations*, 1977, *30*, 675-708.

Dalton, G. W. Influence and organizational change. In A. R. Negandhi (Ed.), Modern organizational theory. Kent State: Comparative Administrative Research Institute, 1969.

Dalton. G. W. Influence and organizational change. In G. Dalton, & P. Lawrence (Eds.), Organizational change and development. Homewood, IL: Irwin-Dorsey, 1970.

Dalton. G. W., Lawrence, P. R., & Greiner, L. E. Organizational change and development. Homewood, IL: Irwin-Dorsey, 1970.

Davis, K. Management communication and the grapevine. Harvard Business Review, 1953, 31, 43-49.

Davis, L., & Cherns, A. (Eds.), The quality of working life. New York: Free Press, 1975.

Davis, R. C. The fundamentals of top management. New York: Harper, 1951.

Dayal, I., & Thomas, J. M. Operation KPE: Developing a new organization. Journal of Applied Behavioral Science, 1968, 4, 473-506.

DeGreene, K. B. Models of man in systems in retrospect and prospect. Erogonomics, 1974, 17, 437-446.

DeGreene, K. B. Limits to societal systems adaptability. Proceedings of the Twenty-fourth Annual Meeting of the Society for General Systems Research, 1980.

Dieterly, D. L., & Schneider, B. The effect of organizational environment on perceived power and climate: A laboratory study. Organizational Behavior and Human Performance, 1974, 11, 316-337.

Dossett, D. L., Latham, G. P., & Mitchell, T. R. Effects of assigned versus participatively set goals, knowledge of results, and individual differences on employee behavior when goal difficulty is held constant. Journal of Applied Psychology, 1979, 64, 291-298.

Drabek, T. E., & Haas, J. E. Laboratory simulation of organizational stress. In W. M. Evan (Ed.), Organizational experiments: Laboratory and field research. New York: Harper and Row, 1971.

Driver, M. J. Conceptual structure and group processes in an Inter-nation simulation. (ONR Tech. Rpt. No. 9, NR161-055) Princeton, NJ: Princeton University and Educational Testing Service, 1962.

Driver, M. J., & Hunsaker, P. L. The Luna I Moon Colony: A programmed simulation for the analysis of individual and group decision making. Psychological Reports, 1972, 31, 879-888.

Drucker, P. F. The practice of management. New York: Harper and Brothers, 1954.

Drucker, P. F. The age of discontinuity. New York: Harper and Row, 1968.

Druckman, D. Understanding the operation of complex social systems: Some uses of simulation design. Simulation and Games, 1971, 2, 173-195.

Druckman, D. Boundary role conflict: Negotiation as dual responsiveness. Journal of Conflict Resolution, 1977, 21, 639-662.

Dunn, W. N., & Swierczek, F. W. Planned organizational change: Toward grounded theory. The Journal of Applied Behavioral Science, 1977, 13, 135-157.

Dunnette, M. D. (Ed.). The handbook of industrial and organizational psychology. Chicago: Rand McNally, 1976.

Dunnette, M. D., & Campbell, J. P. Effectiveness of T-group experiences in managerial training and development. Psychological Bulletin, 1968, 70, 73-104.

Durkheim, E. The rules of sociological method. Glencoe, IL: Free Press, 1950.

Eliason, A. L. A closed model approach to business gaming. Simulation and Games, 1973, 4, 3-17.

Emerson, R. M. Power-dependence relations. American Sociological Review, 1962, 27, 31-40.

Emery, F. E., & Trist, E. L. Socio-technical systems. In C. W. Churchman, & M. Verhulst (Eds.), Management science, models and techniques, Vol. 2, Pergamon, 1960. 83-97.

Emery, F. E., & Trist, E. L. The causal texture of organizational environments. Human Relations, 1965, 18, 21-31.

Emery, F. E., & Trist, E. L. Analytical model for sociotechnical systems. In W. Pasmore, & J. Sherwood (Eds.), Sociotechnical systems: A sourcebook. University Associates, 1978.

Emington, J. Organizational Effectiveness (OE) In An Army Reserve Command (ARCOM), 1978.

Etzioni, A. Modern organizations. Englewood Cliffs, NJ: Prentice-Hall, 1964.

Evan, W. M. (Ed.). Organizational experiments: Laboratory and field research. New York: Harper and Row, 1971.

Fennessey, G. M., Livingston, S. A., Edwards, K. J., Kidder, S. J., & Nafziger, A. W. Simulation, gaming and conventional instruction: An experimental comparison. Simulation and Games, 1975, 6, 288-302.

Festinger, L. Laboratory experiments. In L. Festinger, & D. Katz (Eds.), Research methods in the behavioral sciences. New York: Holt, Rinehart, and Winston, 1953.

Fiedler, F. E. A theory of leadership effectiveness. New York: McGraw-Hill, 1967.

Fiedler, F. E. The effects of leadership training and experience: A contingency model interpretation. Administrative Science Quarterly, 1972, 17, 453-470.

Fiedler, F. E., Chemers, M. M., & Mahar, L. Improving leadership effectiveness: The LEADER MATCH Concept. New York: Wiley and Sons, 1976.

Fiedler, F. E., & Mahar, L. The effectiveness of contingency model training: A review of the validation of LEADER MATCH. Personnel Psychology, 1979, 32, 45-62.

Fiedler, F. E., Potter, E. H. III, Zais, M. M., & Knowlton, W. A., Jr. Organizational stress and the use and misuse of managerial intelligence and experience. Journal of Applied Psychology, 1979, 64, 635-647.

Filley, A. C., & House, J. R. Managerial process and organizational behavior. New York: Scott, Foresman, 1969.

Finkle, R. B. Managerial assessment centers. In M. D. Dunnette (Ed.), Handbook of industrial and Organizational Psychology, Chicago: Rand-McNally, 1976.

Fisher, C. D. The effects of personal control, competence and extrinsic reward systems on intrinsic motivation. Journal of Personality and Social Psychology, 1968, 9, 38-46.

Fisher, C. D. Transmission of positive and negative feedback to subordinates: A laboratory investigation. Journal of Applied Psychology, 1979, 64, 533-540.

Fiske, D. W. & Maddi, S. R. Functions of varied experience. Homewood, IL: Irwin-Dorsey, 1961.

Fleischman, E., Harris, E., & Burtt, H. E. Leadership and supervision in industry: An evaluation of a supervisory training program. Columbus, OH: Ohio State University Bureau of Education Research, 1955.

Foster, G. D., & Davis, E. G. Organizational effectiveness and systems theory: A mixed marriage? Paper presented at the Annual American Psychological Association Conference, Montreal, September 1980.

Franklin, J. L. Characteristics of successful and unsuccessful organizational development. Ann Arbor: University of Michigan Institute for Social Research, 1975. (NTIS No. ADA006-912).

Franklin, J. L. Characteristics of successful and unsuccessful organizational development. Journal of Applied Behavioral Science, 1976, 12, 471-492.

French, W. L., & Bell, C. H. Organization development: Behavioral science interventions for organization improvement (2nd Ed.). Englewood Cliffs, NJ: Prentice-Hall, 1978.

French, R. P., & Raven, B. The bases of social power. In D. Cartwright (Ed.), Studies in social power. Ann Arbor: University of Michigan Institute for Social Research, 1959.

Friedlander, F. The impact of organizational training laboratories upon the effectiveness and interaction of ongoing work groups. Personnel Psychology, 1967, 20, 289-307.

Friedlander, F., & Brown, L. D. Organization development. Annual Review of Psychology, 1974, 25, 313-341.

Friedlander, F., & Brown, L. D. Research on organizational development: A synthesis and some implications. In W. W. Burke (Ed.), Current issues and strategies in organization development. New York: Human Sciences Press, 1977.

Frohman, M. A., Sashkin, M., & Kavanagh, M. J. Action research as applied to organizational development. In S. Spray (Ed.). Organizational effectiveness: Theory-research-utilization. Kent State: The Comparative Administration Research Institute, 1976.

Fromkin, H. L. and Streufert, S. Laboratory experimentation. In M. D. Dunnette (Ed.), Handbook of industrial and organizational psychology. Chicago: Rand-McNally, 1976.

Fry, J., & Cliborn, R. Development, implementation and evaluation of leadership management training with Army battalions. Alexandria, VA: Human Resources Research Organization, 1975.

Gardner, G. Worker's participation: A critical evaluation of Coch & French. Human Relations, 1977, 30, 1071-1078.

Gavin, J. F., & McPhail, S. M. Intervention and evaluation: A proactive team approach to OD. Journal of Applied Behavioral Science, 1978, 14, 175-194.

Gellerman, S. Behavioral strategies. California Management Reviews, 1969, 12, 45-51.

Georgopolous, B. S., & Tannenbaum, A. S. A study of organizational effectiveness. American Sociological Review, 1957, 22, 534-540.

Gerwin, D., & Tuggle, F. D. Modeling organizational decisions using the human problem-solving paradigm. Academy of Management Review, 1978, 4, 762-773.

Ghiselli, E. E., & Siegel, J. P. Leadership and managerial success in tall versus flat organizational structures. Personnel Psychology, 1972, 25, 617-624.

Giblin, E. J. Organization development: Public sector theory and practice. Public Personnel Management, 1976, 5, 108-118.

Gillespie, J. V., & Zinnes, D. A. Embedded game analysis and international conflict control. Behavioral Science, 1977, 22, 22-27.

Glaser, B., & Straus, A. The discovery of grounded theory. Chicago, IL: Aldine, 1967.

Glaser, E. M. Worklife and productivity. New York: Harcourt Brace Jovanovich, 1976.

Goffman, E. On the characteristics of total institutions. In E. Goffman (Ed.), Asylums. New York: Anchor, 1961.

Golembiewski, R. T. Renewing organizations: The laboratory approach to planned change. Itasca, IL: Peacock, 1972.

Golembiewski, R. T., Billingsley, K., & Yeager, S. Measuring change and persistence in human affairs: Types of change generated by OD designs. Journal of Applied Behavioral Science, 1976, 12, 133-157.

Golembiewski, R. T., & Muzenrider, R. Social desirability as an intervening variable in interpreting OD effects. *Journal of Applied Behavioral Science*, 1975, *11*, 317-332.

Goodman, R. A. Organizational preference in research and development. *Human Relations*, 1970, *23*, 279-298.

Gottschalk, L. A., & Pattison, E. M. Psychiatric perspectives on T-groups and the laboratory movement: An overview. *American Journal of Psychiatry,* 1969, *126,* 823-829.

Gouldner, A. W. *Patterns of industrial bureaucracy*. New York: Free Press, 1954.

Gowler, D., & Legge, K. Participation in context: Towards a synthesis of the theory and practice of organizational change: Part II. *Journal of Management Studies*, 1979, *16*, 139-170.

Granda, T. M. *A comparison between a standard map and a reduced detail map within a simulated tactical operations system (SIMTOS)*. (Tech. Ppr. 274) Alexandria, VA: U.S. Army Research Institute, 1976.

Gray, L. N., Mayhew, B. H., Jr., & Campbell, R. Communication and three dimensions of power: An experiment and simulation. *Small Group Behavior*, 1974, *5*, 289-320.

Greenblat, C. S., & Uretsky, M. Simulation in social science. *American Behavioral Scientist*, 1977, *20*, 411-426.

Greiner, L. E. Antecedents of planned organizational change. *Journal of Applied Behavioral Science*, 1967, *3*, 51-85.

Greiner, L. E. Patterns of organizational change. *Harvard Business Review*, 1967, *45*, 119-128.

Greller, M. M., & Herold, P. M. Sources of feedback: A preliminary investigation. *Organizational Behavior and Human Performance*, 1975, *13*, 244-256.

Grimes, A. K. Authority, power, influence, and social control: A theoretical synthesis. *Academy of Management Review*, 1978, *3*, 724-735.

Gross, B. M. *The state of the nation: Social systems accounting*. London: Social Science Paperbacks, 1966.

Guest, R. H. *Organizational change: The effect of successful leadership*. Homewood, IL: Irwin-Dorsey, 1962.

Guetzkow, H. (Ed.). *Simulation in social science: Readings*. Englewood Cliffs, NJ: Prentice Hall, 1962.

Guetzkow, H. E. Differentiation of roles in task-oriented tasks. In D. Cartwright, & A. Zander (Eds.), *Group dynamics: Research and theory* (3rd Ed.). New York: Harper and Row, 1968.

Gulick, L. *Administrative reflections from World War II. Tuscaloosa: University of Alabama Press, 1948, 77.*

Hackman, J. R., & Lawler, E. E. III. Employee reactions to job characteristics. *Journal of Applied Psychology*, 1971, *55*, 259-286.

Hackman, J. F., & Oldham, G. R. Development of the Job Diagnostic Survey. *Journal of Applied Psychology*, 1975, *60*, 159-170.

Hackman, J. R., & Oldham, G. R. Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance*, 1976, *16*, 250-279.

Hackman, J.R., Pearce, J. L., & Wolfe, J. C. Effects of changes in job characteristics on work attitudes and behaviors: A naturally occurring quasi-experiment. *Organizational Behavior and Human Performance*, 1978, *21*, 289-304.

Hage, J. An axiomatic theory of organizations. *Administrative Science Quarterly*, 1965, *10*, 289-321.

Hage, J., & Arhen, M. Relationship of centralization to other structural properties. *Administrative Science Quarterly*, 1967, *12*, 72-91.

Hall, D. T., & Mansfield, R. Organizational and individual response to external stress. *Administrative Science Quarterly*, 1971, *16*, 533-547.

Hall, R. H., & Tittle, C. R. A Note on bureaucracy and its "correlates". *American Journal of Sociology*, 1966, 72, 267-272.

Hallenbeck, C. E., Gallaher, R. B., & Warren, J. Q. The community mental health center management game: Teaching administrative skills by means of computer simulation. *Behavior Research Methods and Instrumentation*, 1977, *9*, 202-208.

Hammond, K. R. & Summers, D. A. Cognitive control. *Psychological Review*, 1972, *79*, 58-67.

Hare, A. P. Small group discussions with participating and supervised leadership. *Journal of Abnormal and Social Psychology*, 1953, *48*, 273-275.

Hare, A. P. Simulating group decisions. *Simulation and Games*, 1970, *1*, 361-376.

Hart, E. W. & Sung, Y. H. Computer and experimental simulation of triad decision-making. *Behavioral Science*, 1976, *21*, 532-547.

Harvey, O. J., Hunt, D. E. & Schroder, H. M. Conceptual systems and personality organization. New York: Wiley and Sons, 1961.

Hellriegel, D., & Slocum, J. W., Jr. Management: A Contingency Approach. Reading, MA: Addison-Wesley 1974.

Hellriegel, D., & Slocum, J. R., Jr. Towards a comparative typology for assessing organizational change models. Academy of Management Proceedings, 1976.

Helme, W. H., Willemin, L. P., & Grafton, F. C. Dimensions of leadership in a simulated combat situation. (Tech. Rsc. Rpt. 1172) U.S. Army Behavior and Systems Research Laboratory, 1971.

Herman, S., & Phillips, R. Applications of Gestalt in OD. Workshop presented at Fall National OD Network Conference, New York, October, 1971.

Hermann, C. F., Crisis in foreign policy: A simulation analysis. Indianapolis: Bobbs-Merrill, 1969.

Hermann, C. F., & Hermann, M. G. Validation studies of the Inter-nation simulation. China Lake, CA: U. S. Naval Ordnance Test Station, December 1963.

Hersey, P., & Blanchard, K. H. Cultural changes: Their influence on organizational structure and management behavior. Training and Development Journal, 1970, 24, 2-3.

Herzberg, F., Mausner, B., & Snyderman, B. B. The motivation to work. New York: Wiley, 1959.

Hickson, D. J., Hinings, C. R., Lee, C. A., Schneck, R. E., & Pennings, J. M. A strategic contingencies theory of intra-organizational power. Administrative Science Quarterly, 1971, 16, 216-229.

Higbee, K. L., & Streufert, S. The perception of experimentally induced success. Psychonomic Science, 1968, 12, 361-362.

Hinings, C. R., & Lee, G. L. Dimensions of organization structure and their context: A replication. Sociology, 1971, 5, 83-93.

Hinings, C. R., Hickson, D. J., Pennings, J. M., & Schneck, R. E. Structural conditions of intra-organizational power. Administrative Science Quarterly, 1974, 19, 22-32.

Hodge, B. and Johnson, H. Management and organizational behavior: A multidimensional approach. New York: Wiley, 1970.

Holdaway, E. A., & Blowers, T. A. Administrative ratios and organizational size: A longitudinal examination. *American Sociological Review*, 1971, *36*, 278-286.

Holmes, D. S., Strasel, H. C., Consentino, C., Brimm, M. Daltas, A. J., & Leader, G. C. *Survey feedback in combat units in the U. S. Army in Europe: A pilot project* (Research Problem Review 78-11) Alexandria, VA: Army Research Institute for the Behavioral and Social Sciences, 1978.

Hornstein, H. A., Bunker, B.B., Burke, W. W., Gindes, M., & Lewicki, R. (Eds.). *Social intervention: A behavioral science approach*. New York: The Free Press, 1971.

House, R. J. Leadership training: Some dysfunctional consequences. *Administrative Science Quarterly*, 1968, *12*, 556-571.

House, R. J. T-Group training: Good or bad? *Business Horizons,* 1969, *12*, 69-77.

House, R. J., & Rizzo, J. R. Role conflict and ambiguity as critical variables in a model of organizational behavior. *Organizational Behavior and Human Performance*, 1972, *7*, 467-505.

Howat, G., & London, M. Attributions of conflict management strategies in supervisor-subordinate dyads. *Journal of Applied Psychology*, 1980, *65*, 172-175.

Hrebiniak, L. G., & Alutto, J. A. Personal and role related factors in the development of organizational commitment. *Administrative Science Quarterly*, 1972, *17*, 552-573.

Hrebiniak, L. G. Job technology, supervision, and work-group structure. *Administrative Science Quarterly*, 1974, *19*, 395-410.

Hrebiniak, L. G. *Complex organizations*. St. Paul, MN: West Publishing Company, 1978.

Hunsaker, P. L. Current developments in leadership training simulations. *Psychological Reports*, 1978, *43*, 115-125.

Hunsaker, P. L., & Hunsaker, D. M. Luna I Moon Colony: An adapted format for analysis of group decision-making in a competitive setting. *Psychological Reports*, 1974, *35*, 411-414.

Hunt, R. G. Technology and organization. *Academy of Management Journal*, 1970, *13*, 235-252.

Hurwitz, J., Zander, A., & Hymovitch, B. Some effects of power on the relations among group members. In D. Cartwright, & A. Zander (Eds.), Group Dynamics. New York: Harper and Row, 1968.

Huse, E. F. Organization development and change. St. Paul, MN: West Publishing, 1975.

Huse, E. F., & Bowditch, J. L. Behavior in organizations: A systems approach to managing. Reading, MA: Addison-Wesley, 1973, (2nd Ed., 1977).

Hylton, C., & Lashbrook, W. B. Apathetic and neutral audiences: A computer simulation and validation. Speech Monographs, 1972, 39, 105-113.

Ilgen, D. R., Fisher, C. D., & Taylor, M. S. Consequences of individual feedback on behavior in organizations. Journal of Applied Psychology, 1979, 64, 349-371.

Inbar, M., & Stoll, C. S. Simulation and gaming in social science. New York: The Free Press, 1972.

Inkson, J. H. K., Pugh, D. S., & Hickson, D. J. Organization context and structure: An abbreviated replication. Administrative Science Quarterly, 1970, 5, 318-329.

Inkson, H. H. K., Schwitter, J. P., Pheysey, D. C., & Hickson, D. J. A comparison of organizational structure and managerial roles. Journal of Management Studies, 1970, 7 , 347-363.

Ivancevich, J. M. A longitudinal assessment of Management By Objectives. Administrative Science Quarterly, 1972, 7, 126-138.

Ivancevich, J. M. Changes in performance in a Management By Objectives program. Administrative Science Quarterly, 1974, 9, 563-574.

Ivancevich, J. M., Szilagyi, A. D., & Wallace, M. J. Organizational behavior and performance. Santa Monica, CA: Goodyear Publishing Co., 1977.

Jacobson, E., Charters, W. E., & Lieberman, S. The use of role concept in the study of complex organizations. Journal of Social Issues, 1951, 7, 18-27.

James, L. R., & Jones, A. P. Organizational structure: A review of structural dimensions and their conceptual relationships With individual attitudes and behavior. Organizational Behavior and Human Performance, 1976, 16 74-113.

Jaog, A. G., & Vroom, V. H. Hierarchical level and leadership style. *Organizational Behavior and Human Performance*, 1977, *18*, 131-145.

Johnson, R. A., Kast, F. E., & Rosenzweig, J. E. *The theory and management of systems*. New York: McGraw-Hill, 1973.

Jones, W. T., & Jones, B. J. The use of a discreet digital simulation for accessing administrative performance. *Behavioral Science,* 1978, *23*, 45-48.

Jucius, M., & Schlender, W. *Elements of managerial action.* Homewood, IL: Irwin-Dorsey, 1965.

Kahn, R. L Organization development: Some problems and proposals. *Journal of Applied Behavioral Science*, 1974, *10*, 485-502.

Kanifer, F. H., Karoly, P., & Newman, A. Source of feedback, observational learning and attitude change. *Journal of Personality and Social Psychology*, 1974, *29*, 30-38.

Kantowitz, B. H. (Ed.). *Human information processing: Tutorials in performance and cognition*. Hillsdale, NJ: Erlbaum, 1974.

Kast, F. E., & Rosenzweig, J. E. (Eds.). *Contingency views of organization and management*. Chicago: Science Research Associates, 1973.

Kast, F. E., & Rosenzweig, J. E. *Organization and Management: A Systems and Contingency Approach*. New York: McGraw-Hill, 1979.

Katz, D. *The influence of job longevity on employee reactions to task characteristics.* Unpublished manuscript. Cambridge, MA: Sloan School of Management, 1976.

Katz, D., & Kahn, R. L. *The social psychology of organizations*. New York: Wiley, 1966.

Katz, D., & Kahn, R. L. *The social psychology of organizations*. (2nd Ed.) New York: Wiley, 1976.

Keller, R. T. Role conflict and ambiguity: Correlates with job satisfaction and values. *Personnel Psychology*, 1975, *28*, 57-64.

Kennedy, J. L. The systems approach: Organizational development. *Human Factors*, 1962, Feb, 25-52.

Kim, J. S., & Hamner, W. C. Effect of performance feedback and goal setting on productivity and satisfaction in an organizational setting. *Journal of Applied Psychology*, 1978, *61*, 48-57.

Kimberly, J. R., & Nielsen, W. R. Organization development and change in organizational performance. Administrative Science Quarterly, 1975, 20, 191-206.

Klimoski, R. J. Simulation methodologies in experimental research on negotiations by representatives. Journal of Conflict Resolution, 1978, 22, 61-77.

Koontz, H., & O'Donnell, C. Management: A systems and contingency analysis of managerial functions. New York: McGraw-Hill, 1976.

Korb, L. J. The organizational and political problems of implementing change in governmental organizations. Educational Technology, 1978, 18, 45-49.

Kotter, J. P. Power, success and organizational effectiveness. Organizational Dynamics, 1978, 6, 27-40.

Kuhn, T. S. The structure of scientific revolutions. Chicago: University Press, 1970.

Lashbrook, W. B. Program ARISTOTLE: Computerized technique for the simulation and analysis of audiences. Illinois: Illinois State University Speech Communications Research Laboratory, 1971.

Lashbrook, W. B., & Sullivan, J. Apathetic and neutral audiences: More on simulation and validation. Speech Monographs, 1973, 40, 317-321.

Lashutka, S. A cross-cultural simulation as a predictor of cross-cultural adjustment. Simulation and Games, 1977, 8, 481-492.

Laszlo, E. Introduction to systems philosophy. New York: Gordon and Breach, 1972.

Latham, G. P., & Baldes, J. J. The practical significance of Locke's theory of goal setting. Journal of Applied Psychology, 1975, 60, 122-24.

Latham, G. P., & Saari, L. M. Importance of supportive behavior in goal setting. Journal of Applied Psychology, 1979, 64, 151-156.

Latham, G. P., & Yukl, G. A. Assigned versus participative goal setting with educated and uneducated wood workers. Journal of Applied Psychology, 1975, 60, 299-302.

Lawler, A., Porter, L., & Tannenbaum, A. Manager's attitudes toward interaction episodes. Journal of Applied Psychology, 1968, 52, 432-439.

Lawrence, P. R. *The changing of organizational behavior patterns*. Boston: Harvard University, Division of Research, Graduate School of Business, 1958.

Lawrence, P. R. *How to deal with resistance to change.* In G. Dalton, & P. Lawrence (Eds.), *Organizational change and development*. Homewood, IL: Irwin-Dorsey, 1970.

Lawrence, P. R., & Lorsch, J. W., *Organization and environment*. Cambridge, MA: Harvard University Press, 1967.

Lawrence, P. R., & Lorsch, J. W. *Organization and environment: Differentation and integration*. Cambridge, MA: Harvard University Graduate School of Business Administration, Division of Research, 1967.

Lawrence, P. R., & Lorsch, J. W. *Developing organizations: Diagnosis and action*. Reading, MA: Addison-Wesley, 1969.

Leavitt, H. J., Dill, W., & Eyring, H. B. *The Organizational world*. New York: Harcourt Brace Jovanovich, 1973.

Leifer, R., & Delbecq, A. Organizational/environmental interchange: A model of boundary spanning activity. *Academy of Management Journal*, 1976, *13*, 382-390.

Lennung, S. A., & Ahlberg, A. The effects of laboratory training: A field experiment. *Journal of Applied Behavioral Science,* 1975, *11*, 177-188.

Lester, J. P., & Stoil, M. J. Evaluating a role-specific simulation. *Simulation and Games,* 1979, *10*, 167-188.

Levinson, H. Management by whose objectives? *Harvard Business Review*, 1970, *48*, 125-134.

Lewin, K. Formalization and progress in psychology. In D. Cartwright (Ed.), *Field theory and social science*. New York: Harper, 1951.

Likert, R. *New patterns of management.* New York: McGraw-Hill, 1961.

Likert, R. *The human organization*. New York: Mc-Graw-Hill 1967.

Lippitt, G. L. *Organization renewal*. New York: Appleton-Century-Crofts, 1969.

Lippitt, G. L., & This, L. Implementing the organization renewal process (ITORP). Training and Development Journal, 1979, 31, 18-25.

Lippitt, R., Watson, J., & Westley, B. The dynamics of planned change: A comparative study of principles and techniques. New York: Harcourt Brace, 1958.

Litterer, J. A. The analysis of organizations. New York: Wiley, 1973.

Livingston, S. A. Effects of a legislative simulation game on the political attitudes of junior high school students. Simulation and Games, 1972, 3, 41-51.

Livingston, S. A., & Kidder, S. J. Role identification and game structure: Effects on political attitudes. Simulation and Games, 1973, 4, 131-144.

Locke, E. A. Toward a theory of task motivation and incentives. Organizational Behavior and Performance, 1968, 157-189.

Lorsch, L., & Lawrence, P. The diagnosis of organizational problems. In J. Thomas & W. Bennis (Eds.), Management of change and conflict. New York: Penguin Books, 1972.

Louis, M. R. A clash between homeostatic and adaptive systems: Socialization and recruitment in organizations. Proceedings of the Twenty-fourth Annual Meeting of the Society for General Systems Research, 1980.

Lucas, H. C., Jr. Performance in a complex management game. Simulation and Games, 1979, 10, 61-74.

Luthans, F. Organizational behavior (2nd Ed.) New York: McGraw-Hill, 1977.

Luthans, F., & Stewart, T. I. A general contingency theory of management. Academy of Management Review, 1977, 2, 181-195.

Mahoney, T., & Weitzel, W. Managerial models of organizational effectiveness. Administrative Science Quarterly, 1969, 14, 357-365.

Mann, F. C. Studying and creating a change. In W. G. Bennis, K. D. Benne, & R. Chin (Eds.), The planning of change. New York: Holt, Rinehart, and Winston, 1961.

Mansfield, R. Bureaucracy and centralization: An examination of organizational structure. *Administrative Science Quarterly*, 1973, *18*, 477-488.

Margulies, N., & Raia, A. P. *Organizational development: Values, process and technology*. New York: McGraw-Hill, 1972.

Marks, M. Organizational adjustment to uncertainty. *The Journal of Management Studies*, 1977, *14*, 1-7.

Marney, M. C., & Smith, N. M. The domain of adaptive systems: A rudimentary taxonomy. *General Systems*, 1964, *IX*, 107-133.

Maslow, A. H. *Eupsychian management*. Homewood, IL: Irwin-Dorsey, 1965.

Masterman, M. The nature of a paradigm. In I. Lakatos, & A. Musgraves (Eds.), *Criticisms and the growth of knowledge*. Cambridge: Cambridge University Press, 1970.

McCall, M. W., Jr., & Lombardo, M. M. *Looking Glass, Inc.: An organizational simulation*. (Tech. Rpt. No. 12) Greensboro, N.C.: Center for Creative Leadership, 1978.

McClelland, D. C., Atkinson, J. W., Clark, R. A., & Lowell, E. L. *The achievement motivation.* New York: Appleton-Century-Crofts, 1953.

McCluskey, M. R. *Perspectives on simulation and miniaturization.* (HumRRO PP-14-72). Alexandria, VA: Human Resources Research Organization, 1972.

McConkey, D. D. *How to manage by results.* New York: American Management Association, 1965.

McConkie, M. L. A clarification of the goal setting and appraisal processes in MBO. *Academy of Management Review*, 1979, *4*, 29-40.

McGill, M. E. *Organization development for operating managers*. New York: AMACOM, 1977.

McGill, M. M. Assessing the effectiveness of organization development (OD) programs. In S. L. Spray (Ed.), *Organizational effectiveness: Theory-research-utilization.* Kent State: Comparative Administration Research Institute, 1976.

McGrath, J. E. Toward a "theory of method" for research in organizations. In W. W. Cooper, H. J. Leavitt, & M. W. Shelly II (Eds.), *New perspectives in organizational research.* New York: Wiley, 1964.

McGrath, J. E. A social psychological approach to the study of negotiation. In R. Bowers (Ed.), Studies on behavior in organizations: A research symposium. Athens: University of Georgia Press, 1966.

McGregor, D. An uneasy look at performance appraisal. Harvard Business Review, 1957, 35, 89-94.

McGregor, D. The professional manager. New York: McGraw-Hill, 1967.

McGregor, D. The human side of enterprise. New York: McGraw-Hill, 1970.

McKelvey, B., & Kilmann, R. Organization design: A participative multivariate approach. Administrative Science Quarterly, 1975, 20, 24-37.

McLeod, J. Behavioral science, systems theory -- and simulation. Behavioral Science, 1974, 19, 57-69.

Melcher, A. J. Theory and application of systems theory: Its promises, problems, and realizations. In A. J. Melcher (Ed.), General Systems and organization theory: Methodological aspects. Kent, OH: Kent State University Press, 1975.

Menninger, K., Mayman, M., & Pruyser, P. The vital balance, New York: Viking, 1963.

Merton, R. K., & Lerner, D. Social scientists and research policy. In W. G. Bennis, K. D. Benne, & R. Chin (Eds.), The planning of change. New York: Holt, Rinehart, and Winston, 1961.

Meyer, H. H., Kay, E., & French, J. R. P. Split roles in performance appraisal. Harvard Business Review, 1965, 43, 123-129.

Meyer, M. W. The two authority structures of bureaucratic organizations. Administrative Science Quarterly, 1968, 13, 211-228.

Meyer, M. W. Size and the structure of organizations: A causal analysis. American Sociological Review, 1972, 37, 434-441.

Mihram, G. A. Simulation methodology. Theory and Decision, 1976, 7, 67-94.

Miles, M. B. Changes during and following laboratory training. Journal of Applied Behavioral Science, 1965, 1, 215-242.

Miles, M.B., Hornstein, H.A., Callahan, D.M., Calder, P.H., & Schiavo, R.S. The consequences of survey feedback: Theory and evaluation. In W. G. Bennis, K. D. Benne, & R. Chin (Eds.), *The planning of change* (2nd Ed.) New York: Holt, Rinehart and Winston, 1969.

Miles, R. E. *Theories of management: Implications for organizational behavior and development*. New York: McGraw-Hill, 1975.

Milgram, S. Some conditions of obedience and disobedience to authority. *Human Relations*, 1965, *18*, 57-76.

Miller, D. Strategy, structure, and environment: Context influences upon some bivariate associations. *Journal of Management Studies*, 1979, *16*, 294-315.

Miller, E. J. & Rice, A. *Systems of organization*. London: Tavistock, 1967.

Miller, J. A. *Structuring/destructuring: Leadership in open systems*. (Tech. Rpt. No. 64) New York: University of Rochester, Management Research Center, 1973.

Miller, J. G. Living systems: Basic concepts. *Behavioral Science*, 1965, *10*, 193-237.

Miller, J. G. The nature of living systems. *Behavioral Science*, 1971, *16*, 277-301.

Miller, J. G. Living systems: The organizations. *Behavioral* Science, 1972, *17*, 1-182.

Miller, J. G. *Living systems*. New York: McGraw-Hill, 1978.

Miller, W. M., & Starr, M. K. *Executive decisions and operations research*. Englewood Cliffs, NJ: Prentice Hall, 1970.

Mills, T. M. *Group transformation*. Englewood Cliffs, N.J.: Prentice Hall, 1964.

Mobley, W. H., Griffeth, R. W., Hand, H. H., & Meglino, B. M. Review and conceptual analysis of the employee turnover process. *Psychological Bulletin*, 1979, *66*, 493-522.

Moos, R. *Evaluating correctional and community settings*. New York: Wiley, 1975.

Moravec, M. A result-oriented approach to OD. *Training and Development Journal*, 1978, *32*, 16-20.

Moser, C.A. *Survey methods and social investigation*. London, England: Heinemann, 1965.

Mott, P.E. *The characteristics of effective organizations*. New York: Harper and Row, 1972.

Nadler, D.A., Mirvis, P. and Cammann, C. The ongoing feedback system. *Organizational Dynamics*, 1976, Spring,

Nadler, D.A., & Pecorella, P.A. Differential effects of multiple interventions in an organization. *Journal of Applied Behavioral Science*, 1975, 11, 348-366.

Nadal, R., Schwar, J., & Blascak, D. *An analysis of corporate organizational development experience and its implications for the future of the Army's Organizational Effectiveness Program*. Carlisle Barracks, PA: U.S. Army War College, 1978.

Nagasawa, R.H. Research with simulation games: An analysis of success striving behavior. *Simulation and Games*, 1970, *1*, 377-389.

Nagel, E. *The structure of science: Problems in the logic of scientific explanation*. New York: Harcourt, Brace and World, 1961.

Nealey, S.M. *Organizational influence: Interpersonal power in military organizations*. Washington, DC: Battelle Human Affairs Research Center, 1976. (NTIS No. ADA022-603).

Neff, F.W. Survey research: A tool for problem diagnosis and improvement in organizations. In S. M. Miller, & A. W. Gouldner (Eds.), *Applied Sociology*. New York: The Free Press, 1965.

Negandhi, A. R. *Organization theory in an open system*. Kennikat Press Corp. and Dunnellan Publishing, 1975.

Nelson, C., & Smith, E. Achieving institutional adaptation using diagonally structured information exchange. *Human Relations*, 1974, *27*, 101-119.

Nutt, P. Models for decision making in organizations and some contextual variables which stipulate optimal use. *Academy of Management Review*, 1976, *1*, 84-94.

O'Reilly, C. Personality-job fit: Implications for individual attitudes and performance. *Organizational Behavior and Human Performance*, 1977, *61*, 395-403.

Odiorne, G. *Management by Objectives: A system of managerial leadership*. Belmont, CA: Fearon Pitman, 1965.

Odiorne, G. *MBO II: A system of managerial leadership for the 80's*, Belmont, CA: Fearon Pitman, 1979.

Oldham, G. R., Hackman, J. R., & Pearce, J. L. Conditions under which employees respond positively to enriched work. *Journal of Applied Psychology*, 1976, *61*, 395-403.

Olmstead, J. A. *Factors in organizational effectiveness*. (HumRRO Prof. Ppr. 1-72). Alexandria, VA: Human Resources Research Organization, 1973.

Olmstead, J. A., Christensen, H. E., & Lackey, L. L. *Components of organizational competence: Test of a conceptual framework*. Alexandria, VA: Human Resources Research Organization, 1973.

Olmstead, J. A., Cleary, F. K., Lackey, L. L., & Salter, J. A. *Development of leadership assessment simulations*. (HumRRO TR 76-21). Alexandria, VA: Human Resources Research Organization, 1976.

Olmstead, J. A., & Elder, B. L. *A catalogue of business games for use in assessing junior company grade officers*. (HumRRO RP 77-22). Alexandria, VA: Human Resources Research Organization, 1977.

Olmstead, J. A., & Elder, B. L. *The use of management games for developing Army officers in administrative and staff jobs*. (ARI TR-78-A2) Alexandria, VA: U.S. Army Research Institute, 1978.

Olmstead, J. A., Elder, B. L., & Forsyth, J. M. *Organizational process and combat readiness: Feasibility of training organizational effectiveness staff officers to assess command group performance*. (HumRRO IR-ED-78-13) Alexandria, VA: Human Resources Research Organization, 1978.

Ottaway, R. N., & Cooper, C. L. Moving toward a taxonomy of chage agents. *International Studies of Management and Organizations*, 1978, *8*, 7-21.

Ouchi, W. G. The transmission of control through organizational hierarchy. *Academy of Management Journal*, 1978, *21*, 173-193.

Parsons, T. *Structure and process in modern society*. New York: Free Press, 1960.

Pasmore, W. A., & King, D. C. Understanding organizational change: A comparative study of multifaceted interventions. *Journal of Applied Behavioral Science*, 1978, *14*, 455-468.

Pasmore, W. A., et al. *Sociotechnical systems: An integrated literature review and analytical model*. Ohio: Case Western Reserve University, 1980.

Pate, L. E., Neilsen, W. R., & Bacon, P. C. Advances in research on organization development. *Academy of Management Proceedings*, 1976.

Pate, L. E., Nielsen, W. R., & Monday, R. A longitudinal assessment of the impact of organizational development on absenteeism, grievance rates, and product quality. *Academy of Management Proceedings*, 1977.

Peery, N. S., Jr. General Systems Theory: An inquiry into its social philosophy, *Academy of Management Journal*, 1972, *15*, 495-510.

Perrow, C. The analysis of goals in complex organizations. *American Sociological Review*, 1966, *31*, 354-366.

Perrow, C. A framework for the comparative analysis of organizations. *American Sociological Review*, 1967, *32*, 194-208.

Perrow, C. Departmental power and perspectives in industrial firms. In M. N. Zald (Ed.), *Power in organizations*. Nashville, TN: Vanderbilt University Press, 1970.

Perrow, C. *Organizational analysis: a sociological view*. Belmont, CA.: Wadsworth, 1970.

Pfeffer, J., & Salancik, G. R. Determinants of supervisory behavior: A role set analysis. *Human Relations*, 1975, *28*, 139-154.

Pierce, J., & Dunham, R. Task design: A literature review. *Academy of Management Review*, 1976, *1*, 83-97.

Pondy, L. R. Effects of size, complexity, and ownership on administrative intensity. *Administrative Science Quarterly*, 1969, *14*, 47-60.

Pondy, L. R. Organizational conflict: Concepts and models. *Administrative Science Quarterly*, 1967, *12*, 296-320.

Porras, J. I. The comparative impact of different OD techniques and intervention intensities. *Journal of Applied Behavioral Science*, 1979, *15*, 156-178.

Porras, J. I., & Berg, P. O. Evaluation methodology in organizational development: An analysis and critique. *Journal of Applied Behavioral Science*, 1978, *14*, 151-174.

Porter, L. W., Lawler, E. E. III, & Hackman, J. R. *Behavior in organizations*. New York: McGraw-Hill, 1975.

Price, J. L. Design of proof in organizational research. *Administrative Science Quarterly*, 1968, *13*, 122. (a)

Price, J. L. *Organizational effectiveness: An inventory of propositions*. Homewood, IL: Irwin-Dorsey, 1968. (b)

Pritsker, A. A. Compilation of definitions of simulation. *Simulation*, 1979, *1*, 61-63.

Pruden, H. O., & Reese, R. M. Interorganizational role-set relations and the performance and satisfaction of industrial salesmen. *Administrative Science Quarterly*, 1972, *17*, 601-609.

Pugh, D. S., Hickson, D. J., Hinings, C. R., & Turner, C. Dimensions of organization structure. *Administrative Science Quarterly*, 1968, *13*, 65-105.

Pugh, D. S., Hickson, D. J., & Hinings, C. R. An empirical taxonomy of structures of work organizations. *Administrative Science Quarterly*, 1969, *14*, 115-125.

Raia, A. P. Goal setting and self control. *Journal of Management Studies*, 1965,

Raia, A. P. A second look at management goals and control. *California Management Review*, 1966, *9*.

Rapoport, A. System analysis: General Systems Theory. *International Encyclopedia of the Social Sciences*. New York: Macmillan, 1968.

Rapoport, A., & Horvath, W. J. Thoughts on organization theory. *General Systems*, 1959, *IV*, 87-91.

Rousser, G. C., & Johnson, S. R. On the limitations of simulation in model evaluation and decision analysis. *Simulation and Games*, 1975, *6*, 115-149.

Reddin, W. J. *Managerial effectiveness*. New York: McGraw-Hill, 1970.

Reddin, W. J. *Management by Objectives*. New York: McGraw Hill, 1971.

Reeves, T. K., & Woodward, J. The study of managerial control. In J. Woodward (Ed.), *Industrial organization: behavior and control*. London: Oxford University Press, 1970.

Reimann, B. C. Dimensions of structure in effective organizations: Some empirical evidence. *Academy of Management Journal*, 1974, *17*, 693-708.

Reimann, B. C. On the dimensions of bureaucratic structure: An empirical reappraisal. *Administrative Science Quarterly*, 1973, *18*, 462-76.

Renwick, P. A. Perception and management of superior-subordinate conflict. *Organizational Behavior and Human Performance*, 1975, *13*, 444-456.

Reynolds, P. D. *A primer in theory construction*. Indianapolis: Bobbs-Merrill, 1971.

Ridgeway, V. Dysfunctional consequences of performance measurements. *Administrative Science Quarterly*, 1956, *1*, 240-247.

Robins, J. E., Buffardi, L., & Ryan, T. G. *Research on tactical military decision making: Application of a decision prediction concept in a SIMTOS environment*. (ARI TP-246). Alexandria, VA: US Army Research Institute, 1974.

Roeckelein, J. E. *Simulation of organizations: An annotated bibliography*. (HumRRO TR-67-14) Alexandria, VA: Human Resources Research Organization, 1967.

Ross, P. F. Innovation adoption by organizations. *Personnel Psychology*, 1974, *27*, 21-47.

Ruben, B. D. Toward a theory of experience-based instruction. *Simulation and Games*, 1977, *8*, 211-231.

Ruben, B. D., & Kim, J. Y. *General systems theory: Human communication*. Rochelle Park, NJ: Hayden, 1975.

Ruggiero, F. An overview of the development of computer modeling for instructional and research purposes. *Behavior Research Methods and Instrumentation*, 1977, *9*, 76-80.

Sagasti, F. A conceptual and taxonomic framework for the analysis of adaptive behavior. *General Systems*, 1970, *XV*, 151-160.

Salancik, G. R., & Pfeffer, J. Who gets power -- and how they hold on to it: A strategic contingency model of power. *Organizational Dynamics*, 1977, Winter, 3-21.

Salancik, G. R., & Pfeffer, J. The bases and use of power in organizational decision making: The case of a university. *Administrative Science Quarterly*, 1974, *19*, 453-473.

Salancik, G., & Pfeffer, J. An examination of need-satisfaction models of job attitudes. *Administrative Science* Quarterly, 1977, *22*, 427-456.

Schein, E. H. *Organizational psychology*. Englewood Cliffs, NJ: Prentice Hall, 1965. (2nd Ed., 1970).

Schein, E. H. Management development as a process of influence. *Industrial Management*, 1967, *II*.

Schein, E. H. *Process consultation: Its role in organization development*. Reading, MA: Addison-Wesley, 1969.

Schein, V. E., & Greiner, J. E. Can organizational development be fine tuned to bureaucracies? *Organizational Dynamics*, 1977, Winter, 48-61.

Schleb, E. C. *Management by results*. New York: McGraw-Hill, 1971.

Schmuck, R. A., Runkel, P. J., & Langmeyer, D. Improving organizational problem solving in a school faculty. *Journal of Applied Behavioral Science*, 1969, *5*, 455-482.

Schroder, H. M., Driver, M. J., & Streufert, S. *Human information processing*. New York: Holt, Rinehart and Winston, 1967

Schuler, R. S., Aldag, R. J., & Brief, A. P. Role conflict and ambiguity: A scale analysis. *Organizational Behavior and Human Performance*, 1977, *20*, 111-128.

Schultz, R. L. The use of simulation for decision-making. *Behavioral Science*, 1974, *19*, 344-350.

Scott, W. G. Organization theory: A reassessment. *Academy of Management Journal*, 1974, *17*, 242-254.

Scott, W. G. Organicism: The moral anesthetic of management. *Academy of Management Review*, 1979, *4*, 21-28.

Scott, W. R. Field methods in the study of organizations. In J.G. March (Ed.), Handbook of organizations. Chicago: Rand McNally, 1965.

Scott, W. R., Dornbusch, S. M., Busching, B. C., & Laing, J. D. Organizational evaluation and authority. Administrative Science Quarterly, 1967, 12 93-117.

Scott, W. R., Osgood, D. W., & Peterson, C. Cognitive structure: Theory and measurement of individual differences. Washington D.C.: V.H. Winston and Sons and John Wiley, 1979.

Seashore, S. and Bowers, D. G. Changing the structure and functioning of an organization (Monograph No. 33). Ann Arbor: Survey Research Center, Institute for Social Research, 1963.

Seltzer, R. A. Simulation of the dynamics of action. Psychological Reports, 1973, 32, 859-872.

Selye, H. The stress of life, New York: McGraw-Hill, 1956.

Selznick, P. Foundations of the theory of organization. American Sociological Review, 1948, 3, 25-35.

Shapira, Z., & Dunbar, R. L. Testing Mintzberg's managerial roles classification using an in-basket simulation. Journal of Applied Psychology, 1980, 65, 87-95.

Shiflett, S., & Cohen, S. Initial results of an organizational development program in an Air Defense Command. Alexandria, VA: U.S. Army Research Institute, 1975.

Shirts, R. G. BaFa BaFd: A cross culture simulation. Del Mar, Cal.: Simile II, 1974.

Shubik, M. Bibliography on simulation, gaming, artificial intelligence and allied topics. Journal of the American Statistical Association, 1960, Dec , 736-751.

Shubik, M. Game theory behavior and the paradox of the Prisoner's Dilemma: Three solutions. Journal of Conflict Resolution , 1970, 14, 181-194.

Shubik, M., & Brewer, G. Methodological advances in gaming. Simulation and Games, 1972, 3, 329-347.

Siegfried, W. D. Evaluation of OD battle interventions. Fort Ord, CA: Army Organizational Effectiveness Training Center, 1975.

Siegfried, W. D. *The Fort Ord Organization Development Program: A comprehensive application of behavioral science to human resource development and management*. Fort Ord, CA: Organizational Effectiveness Training Center, 1975.

Simon, H. A. On the concept of organizational goal. *Administrative Science Quarterly*, 1964, *9*, 1-22.

Small, M. G. What's wrong with systems? An inquiry into the negative criticisms directed at systems analysis and systems theory. Proceedings of the 1980 North American Meeting of the Society for General Systems Research, 1980.

Smith, C. G. Consultation and decision processes in a research and development laboratory. *Administrative Science Quarterly*, 1970, *15*, 203-215.

Solomon, R. J. An examination of the relationship between a survey feedback OD technique and the work environment. *Personnel Psychology*, 1976, *29*, 583-594.

Spekman, R. E. Influence and information: An exploratory investigation of the boundary role person's basis of power. *The Academy of Management Journal*, 1979, *22*, 104-117.

Spencer, L. M., Jr., & Cullen, B. J. *Taxonomies of organizational change: Literature review and analysis*. Boston, MA: McBer Company, 1978.

Spencer, L.M., Jr., & Cullen, B. J. *Evaluation of Army organizational development interventions*. Boston, MA: McBer and Co., 1979.

Srivasta, S., et al. *Job satisfaction and productivity*. OH: Case Western Reserve University, 1975.

Stagner, R. Conflict in the executive suite. In W. G. Bennis (Ed.) *American Bureaucracy*. Chicago: Aldine, 1970.

Starbuck, W. H. Organizational growth and development. In J. G. March (Ed.) *Handbook of Organizations*. New York: Rand McNally, 1965.

Staw, B. M. Attribution of the 'causes' of performance: A general alternative interpretation of cross-sectional research on organizations. *Organizational Behavior and Human Performance*, 1975, *13*, 414-432.

Steers, R. M. Problems in the measurement of organizational effectiveness. Administrative Science Quarterly, 1975, 20, 546-558.

Steers, R. M. Task-goal attributes, n achievement, and supervisory performance. Organizational Behavior and Human Performance, 1975, 13, 392-403.

Steers, R. M. Organizational effectiveness: A behavioral view. Santa Monica, CA: Goodyear, 1977.

Steers, R. M., & Porter, L. W. The role of task-goal attributes in employee performance. Psychological Bulletin, 1974, 81, 434-452.

Steers, R. M., & Spencer, D. G. The role of achievement motivation in job design. Journal of Applied Psychology 1977, 62, 472-479.

Stern, L. W., & Sternthal, B. Strategies for managing interorganizational conflict: A laboratory paradigm. Journal of Applied Psychology, 1975, 60, 472-482.

Stone, E., Mowday, R., & Porter, L. Higher order needs strengths as moderators of the job scope--job satisfaction relationship. Journal of Applied Psychology, 1977, 62, 466-471.

Stotland, E., & Kohler, A. L. Life and death of a dental hospital. Seattle: University of Washington, 1965.

Streufert, S. Increasing failure and response rate in complex decision making. Journal of Experimental Social Psychology, 1969, 5, 310-323.

Streufert, S. Complexity and complex decision making: Convergences between differentiation and integration approaches to the prediction of task performance. Journal of Experimental Social Psychology, 1970, 6, 494-509.

Streufert, S. Complex military decision making. Naval Research Reviews, 1970, 23, 12-19.

Streufert, S. Success and response rate in complex decision making. Journal of Experimental Social Psychology, 1972, 8, 389-403.

Streufert, S. C. Effects of information relevance on decision-making in complex environments. Memory and Cognition, 1973, 1, 224-228.

Streufert, S. The human component in the decision making situation. In B. T. King, S. Streufert, & F. Fiedler (Eds.), *Managerial control and organizational democracy*. Washington, D.C.: Victor H. Winston and Sons and Halsted Division, John Wiley and Sons, 1978.

Streufert, S., Cafferty, T., & Cherry, F. Information load, group composition and communication frequency. *Psychonomic Science*, 1972, *27*, 348-350.

Streufert, S., & Castore, C. H. Effects of increasing success and failure in perceived information quality. *Psychonomic Science*, 1968, *11*, 63-64.

Streufert, S., & Castore, C. H. Information search and the effects of failure: A test of complexity theory. *Journal of Experimental Social Psychology*, 1971, *7*, 125-143.

Streufert, S., Clardy, M. A., Driver, J. S., Karlins, M., Schroder, H. M., & Suedfeld, P. A tactical game for the analysis of complex decision making in individuals and groups. *Psychological Reports*, 1965, *17*, 723-729.

Streufert, S., & Driver, M. J. Conceptual structure, information load and perceptual complexity. *Psychonomic Science*, 1965, *3*, 249, 250.

Streufert, S., Driver, M. J., & Haun, K.W. Components of response rate in complex decision making. *Journal of Experimental Social Psychology*, 1967, *3*, 286-295.

Streufert, S., & Schroder, H. M. Conceptual structure, environmental complexity and task performance. *Journal of Experimental Research in Personality*, 1965, *1*, 132-137.

Streufert, S., & Streufert, S. C. The effect of conceptual structure, failure and success on attribution of causality and interpersonal attitudes. *Journal of Personality and Social Psychology*, 1969, *11*, 138-147.

Streufert, S., & Streufert, S. C. Effects of increasing failure and success on military and economic decision making. *Journal of Applied Psychology*, 1970 , *54*, 393-400. (a)

Streufert, S., & Streufert, S. C. The perception of information relevance. *Psychonomic Science*, 1970 , *18*, 199-200. (b)

Streufert, S., & Streufert, S. C. *Behavior in the complex environment*. Washington, D.C.: Victor H. Winston and Sons and Halsted Press Division, John Wiley and Sons, 1978.

Streufert, S., & Suedfeld, P. Simulation as a research method: A problem in communication. Editorial, *Journal of Applied Social Psychology*, 1977, *7*. 281-285.

Streufert, S., Suedfeld, P., & Driver, M. J. Conceptual structure, information search and information utilization. *Journal of Personality and Social Psychology*, 1965, *2*, 736-740.

Sudman, S., & Bradburn, N. *Response effects in surveys*. Chicago: Aldine, 1974.

Streufert, S., & Swezey, R. W. *Organizational simulation: Theoretical aspects of test bed design*. McLean, VA: Science Applications, Inc., 1980.

Suedfeld, P. Characteristics of decision-making as a function of the environment. In B. King, S. Streufert, & F. Fiedler (Eds.), *Managerial control and organizational democracy*. Washington, D.C.: V.H. Winston and Sons, 1978.

Suedfeld, P., & Rank, A. D. Revolutionary leaders: Long-term success as a function of changes in conceptual complexity. *Journal of Personality and Social Psychology*, 1976, *34*, 169-178.

Suedfeld, P., & Streufert, S. Information search as a function of conceptual and environmental complexity. *Psychonomic Science*, 1966, *4*, 351-352.

Sung, Y. H., & Castore, C. H. The similarity of individual and group goal structures and support accorded group decision. (ONR TR-8). Washington, DC: Office of Naval Research, 1978.

Swezey, R. W. Future directions in simulation and training. *Journal of Educational Technology Systems*, 1978, *64*, 285-292.

Sykes, G. M. *The society of captives*. New York: Atheneum, 1958.

Tallman, I., & Wilson, L. Simulating social structures: The use of a simulation game in cross-national research. *Simulation and Games*, 1974, *5*, 147-167.

Tannenbaum, A. *Control in organizations*. Mc-Graw-Hill, 1968.

Tannenbaum, A., Kavicic, B., Rosner, M. Vianello, M., & Weiser, G. *Hierarchy in organization*. San Francisco: Jossey-Bass Publishers, 1974.

Terreberry, S. The evolution of organizational environments. Administrative Science Quarterly, 1968, 12, 590-613.

Thomas, K. Conflict and conflict management. In M. D. Dunnette (Ed.), Handbook of industrial and organizational psychology. Chicago: Rand McNally, 1976.

Thompson, J. A. Organization in action. New York: McGraw-Hill, 1967.

Toby, J. Some variables in role conflict analysis. Social Forces, 1952, 30, 323-327.

Tosi, H. L., & Carroll, S. Management by Objectives. Personnel Administration, 1970, 33, 44-48.

Trist, E. L. On socio-technical systems. In W. G. Bennis, K. D. Benne & R. Chin (Eds.), The planning of change. New York: Holt, Rinehart and Winston, 1969.

Tuggle, F. D. Organizational processes. Arlington Heights, IL: AHM Publishing, 1978.

Tuggle, F. D. Theory content and explanatory power of simulation models. Behavioral Science, 1978, 23, 271-290.

Turney, J. R., & Cohen, S. L. Organizational implications for practicing OD in the Army. Personnel Psychology, 1978, 31, 731-738.

U.S. Army Command and General Staff College. Reference Book: Organizational Effectiveness (RB 12-2). Kansas: Fort Leavenworth, 1979.

Umstot, D. D. Organization development technology and the military: A surprising merger? Academy of management Review, 1980, 5, 189-201.

Umstot, D. D., Mitchell, T. R., & Bell, C. H., Jr. Goal setting and job enrichment: An integrated approach to job design. Academy of Management Review, 1978, 3, 867-879.

Umstot, D. D., Bell, C. H., Jr., & Mitchell, T. R. Effects of job enrichment and task goals on satisfaction and productivity: Implications for job design. Journal of Applied Psychology, 1976, 61, 379-394.

Vancil, R. F. Strategy formulation in complex organizations. Sloan Management Review, 1976, 17, 1-18.

Wagner, L. W., & Palola, E. G. The miniature replica model and its use in laboratory experiments of complex organiazations. *Social Forces*, 1964, *42*, 418-428.

Wagner, L. W., & Palola, E. G. The miniature replica model and its use in laboratory experiments of complex organizations. *Social Forces*, 1964, *42*, 418-428.

Walther, H. J. *Catalog of war gaming and military simulation* models. Washington, D.C.: Studies Analysis and Gaming Agency, 1975. (NTIS No. ADA012-803)

Walton, R. E. Advantages and attributes of the case study. *Journal of Applied Behavioral Science*, 1972, *8*, 73-78.

Wanous, J. P. Individual differences and reaction to job characteristics. *Journal of Applied Psychology*, 1974, *59*, 612-622.

Warner, W. K., & Havens, A. E. Goal displacement and the intangibility of organizational goals. *Administrative Science Quarterly*, 1968, *12*, 539-555.

Waters, C. A. Building internal resources for organizational development. In *Proceedings of the executive study conference*. Princeton: Educational Testing Service, 1968.

Watson, G. Resistance to Change. In W. G. Bennis, K. D. Benne, & R. Chin (Eds.), *The planning of change*, New York: Holt, Rinehart and Winston, 1969.

Webb, R. J. Organizational effectiveness and the voluntary organization. *Academy of Management Journal*, 1974, *17*, 663-677.

Weber, M. *The theory of social and economic organizations*, translated by A. Henderson, & Talcott Parsons. New York: Free Press, 1947.

Weed, S. E., & Mitchell, T. R. The role of environmental and behavioral uncertainty as a mediator of situation-performance relationships. *The Academy of Management Journal*, 1980, *23*, 38-60.

Weick, K. E. Laboratory experiments with organizations. In J. G. March (Ed.), *Handbook of organizations*. Chicago: Rand-McNally, 1965.

Weick, K. E. *The social psychology of organizing*. Reading, MA: Addison-Wesley, 1969.

Weitz, J., & Adler, S. The optional use of simulation. Journal of Applied Psychology, 1973, 58, 219-224.

White, S. E., & Mitchell, T. R. Organization development: Research content and research design. Academy of Management Review, 1976, 1, 57-73.

White, S. E., & Mitchell, T. R. Job enrichment versus social cues: A comparison and competitive test. Journal of Applied Psychology, 1979, 64, 1-9.

Williams, E. G. Changing systems and behaviors. Business Horizons, 1969, 50-61.

Williams, P. M. Organization self-development. Training and Development Journal, 1978, 32, 42-47.

Wing, R. L. Two computer based economics games for sixth graders. American Behavioral Scientist, 1966, 10, 31-34.

Witkin, H. A., Goodenough, D. R., & Karp, S. A. Stability of cognitive style from childhood to young adulthood. Journal of Personality and Social Psychology, 1967, 7, 291-300.

Wolf, G. Effects of comparative information and decision complexity in a one-person game. Simulation and Games, 1973, 4, 145-157.

Woodman, R. W., & Sherwood, J. J. Effects of team development intervention: A field experiment. Journal of Applied Behavioral Science, 1980, 16, 211-227.

Woodward, J. Industrial organization: Theory and Practice. London: Oxford University Press, 1965.

Zelditch, M., Jr., & Evan, W. M. Simulated bureaucracies: A methodological analysis. In H. Guetekow (Ed.), Simulation in social science: Readings. Englewood Cliffs, New Jersey: Prentice-Hall, 1962.

Zelditch, M., Jr., & Hopkins, T. K. Laboratory experiments with organizations. In W. M. Evan (Ed.), Organizational experiments: Laboratory and field research. New York: Harper and Row, 1971.

Zey-Fenel, M., Dimensions of organizations. Santa Monica, CA: Goodyear, 1979.

Ziller, R. C. Toward a theory of open and closed groups. Psychological Bulletin, 1965, 64, 164-182.

Zmud, R. W., & Armenakis, A. Understanding the measurement of change. _Academy of Management Review_, 1978, _3_, 661-669.